
# Dual Inheritance, Ecological Peril, & the Morality of Procreation

*Chris Jensen, Associate Professor*
*Department of Mathematics & Science, Pratt Institute*

CHRISTOPHER X J. JENSEN

Associate Professor, Pratt Institute

# A scientist among creatives

## *I have taught courses in:*

- ★ Ecology
- ★ Evolution
- ★ The Evolution of Cooperation
- ★ The Evolution of Sex
- ★ The Evolution of Play
- ★ The Evolution of Music
- ★ Behavioral Ecology
- ★ Human Evolution

Pratt

*School of Liberal Arts & Sciences*
*Department of Mathematics & Science*

*Image Source: pratt.edu*

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Associate Professor, Pratt Institute

# I’m a breeder!


*Image Source:* Jensen personal archive


*Leaving aside the question of conscious belief or personal opinion about one's goals or intentions, there is every reason to accept that* ***humans, like other organisms, are so evolved that their "interests" are reproductive.***

- Richard D. Alexander, Zygon 1985

*Source:* Alexander, Richard D. 1985. A Biological Interpretation of Moral Systems. *Zygon* 20:3-20.

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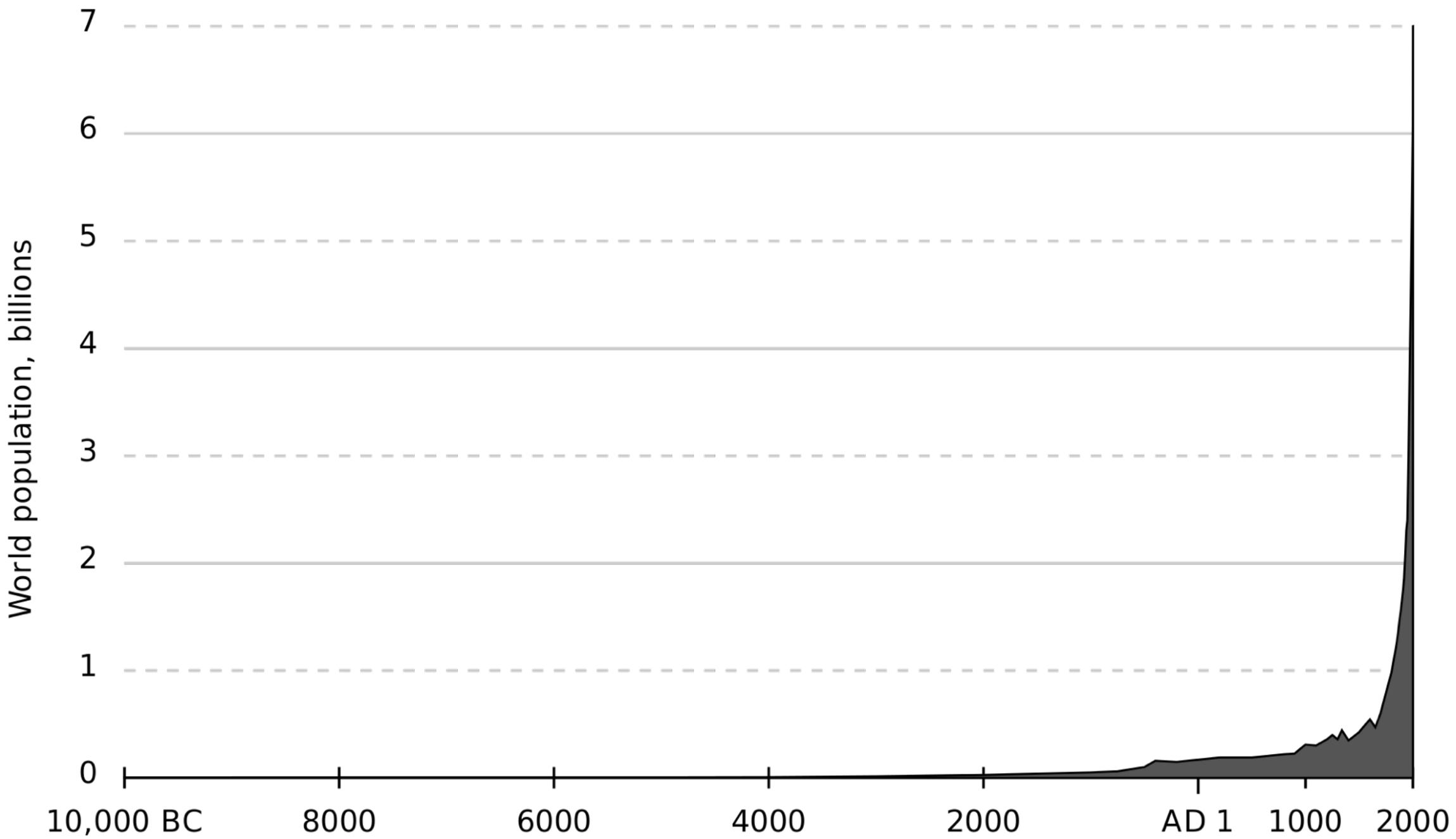
# Human population growth




*Source:* https://commons.wikimedia.org/wiki/File:Population_curve.svg

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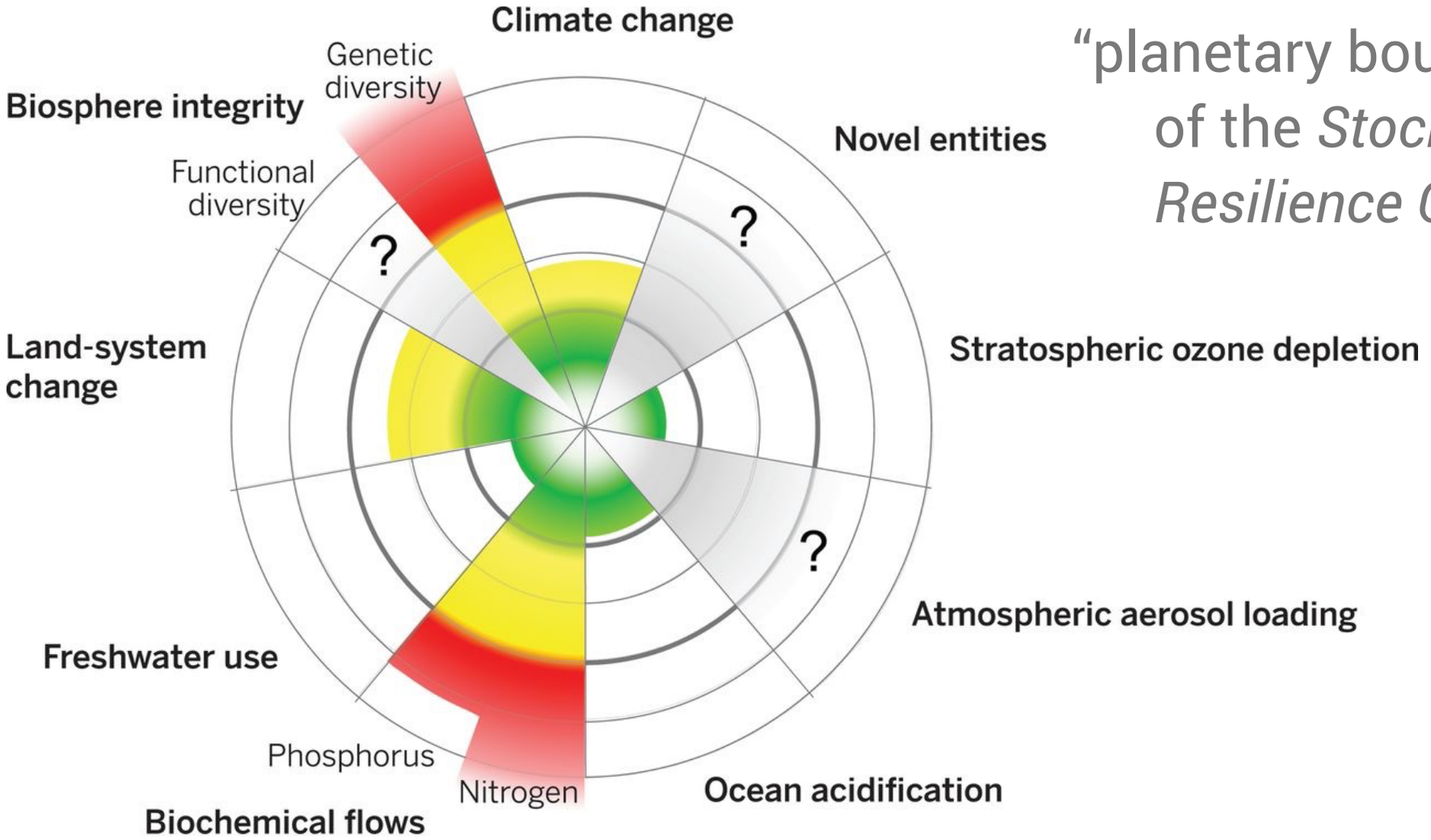
# Ecological Peril




"planetary boundaries" of the *Stockholm Resilience Center*

*Source:* Steffen *et al.* 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347:1259855.

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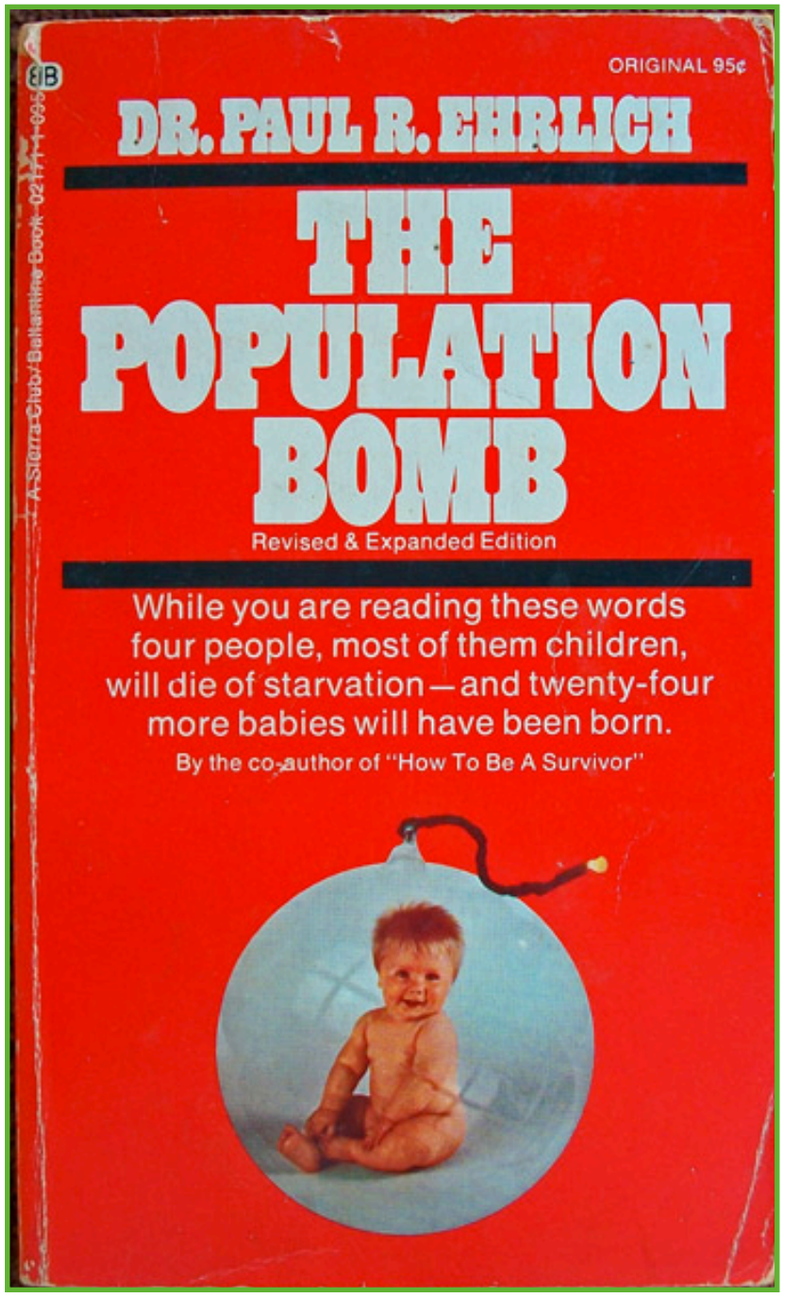
# The moral implications of procreation





Source: http://www.culturechange.org/cms/content/view/925/66/

Source: http://caitfutureteacher.blogspot.com/2012/04/political-cartoon-analysis-worksheet.html

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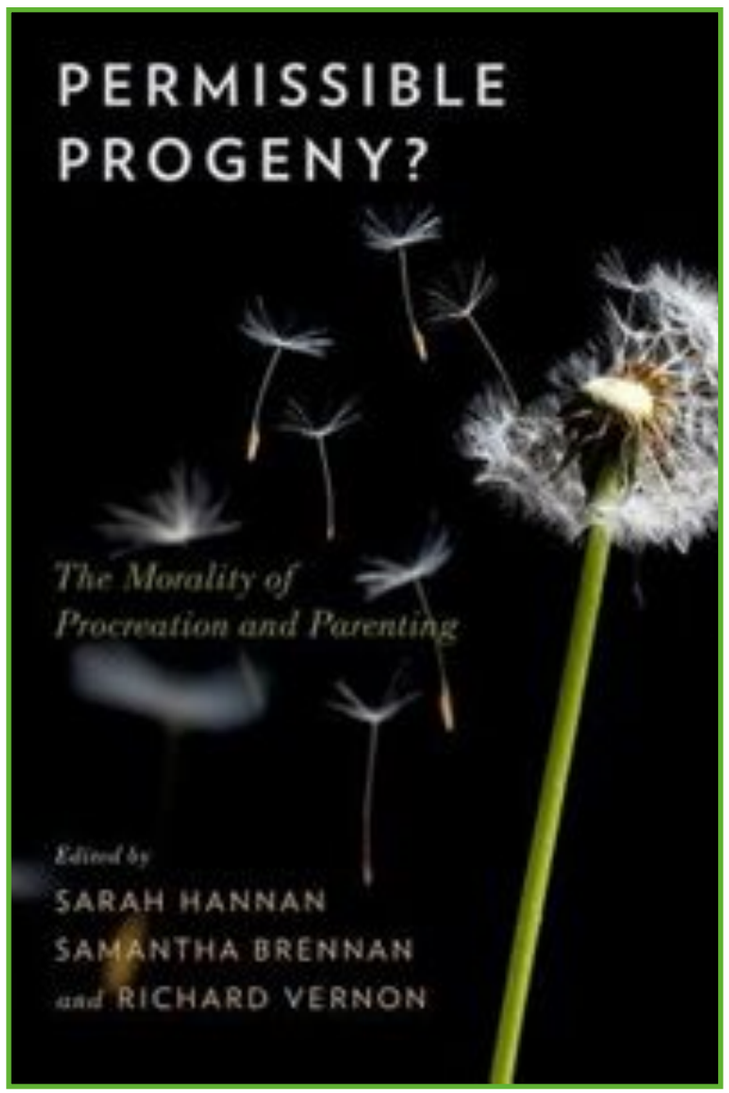
# The moral implications of procreation




2015

## Procreation or Appropriation?

Corey MacIver

DOI:10.1093/acprof:oso/9780199378111.003.0005

### Abstract and Keywords

This chapter argues that the standard dichotomy between “procreation” and “consumption” should be collapsed. Procreative choices cannot be materially differentiated from other voluntary choices with environmental consequences. As such, the impacts associated with procreation should be understood as part of the “ecological footprint” of parents—a conceptual distinction that has significant consequences for how we attribute moral responsibility for environmental degradation. Perhaps more importantly, if and when procreation threatens or compromises the material interests of others, it is legitimately subject to moral scrutiny or even intervention by third parties. The idea that procreative decisions are private or pre-political cannot be sustained in a materially finite world.

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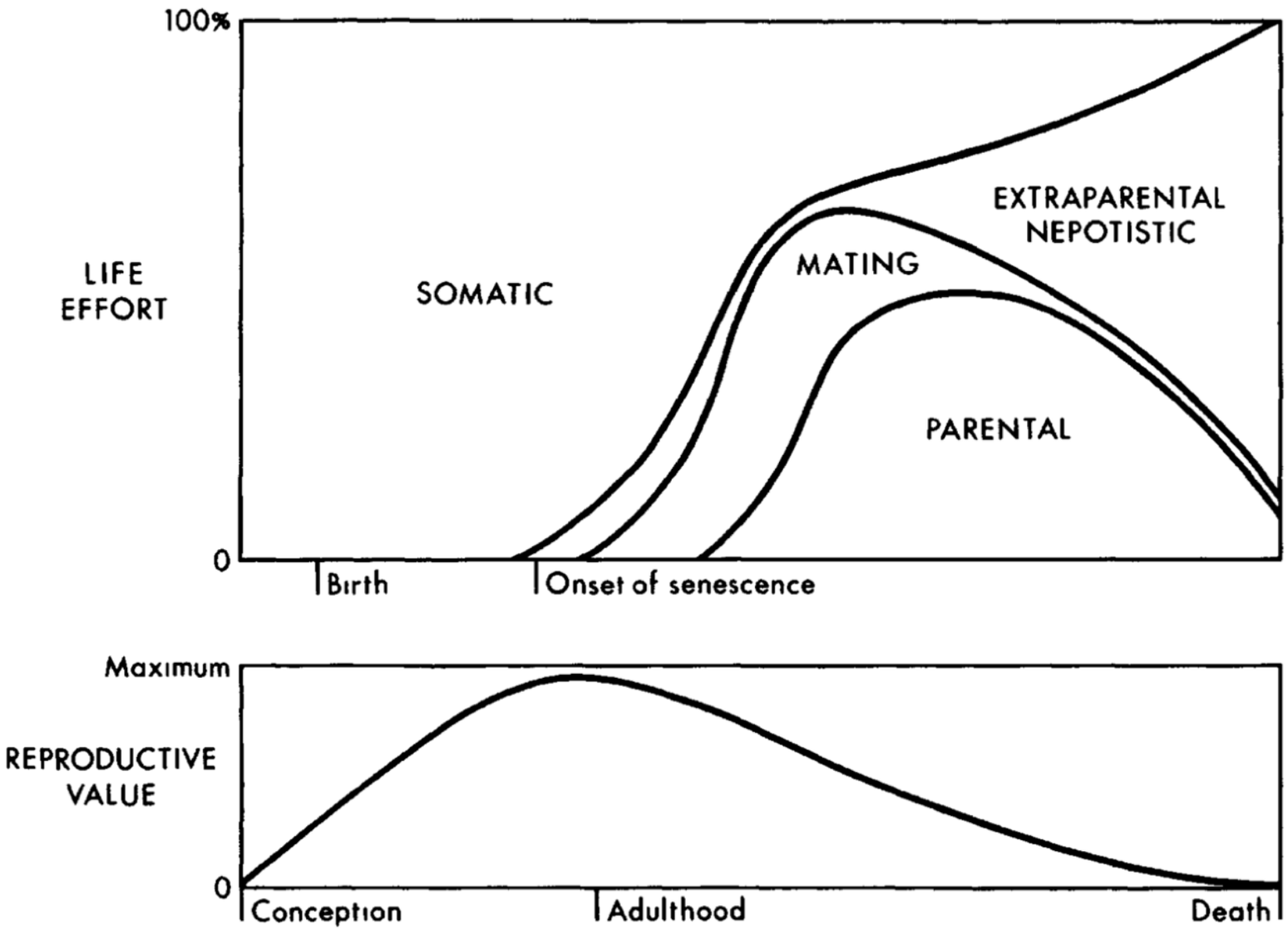
Associate Professor, Pratt Institute

# Figure 1 of Richard D. Alexander's 1985 *Zygon* paper




Are we genetically programmed to do something that's destroying the ecosystems upon which our species depends?

Can we be held morally responsible for what is a biologically-evolved instinct?

***Does this figure truly capture human "life effort"?***

*Source:* Alexander, Richard D. 1985. A Biological Interpretation of Moral Systems. *Zygon* 20:3-20.

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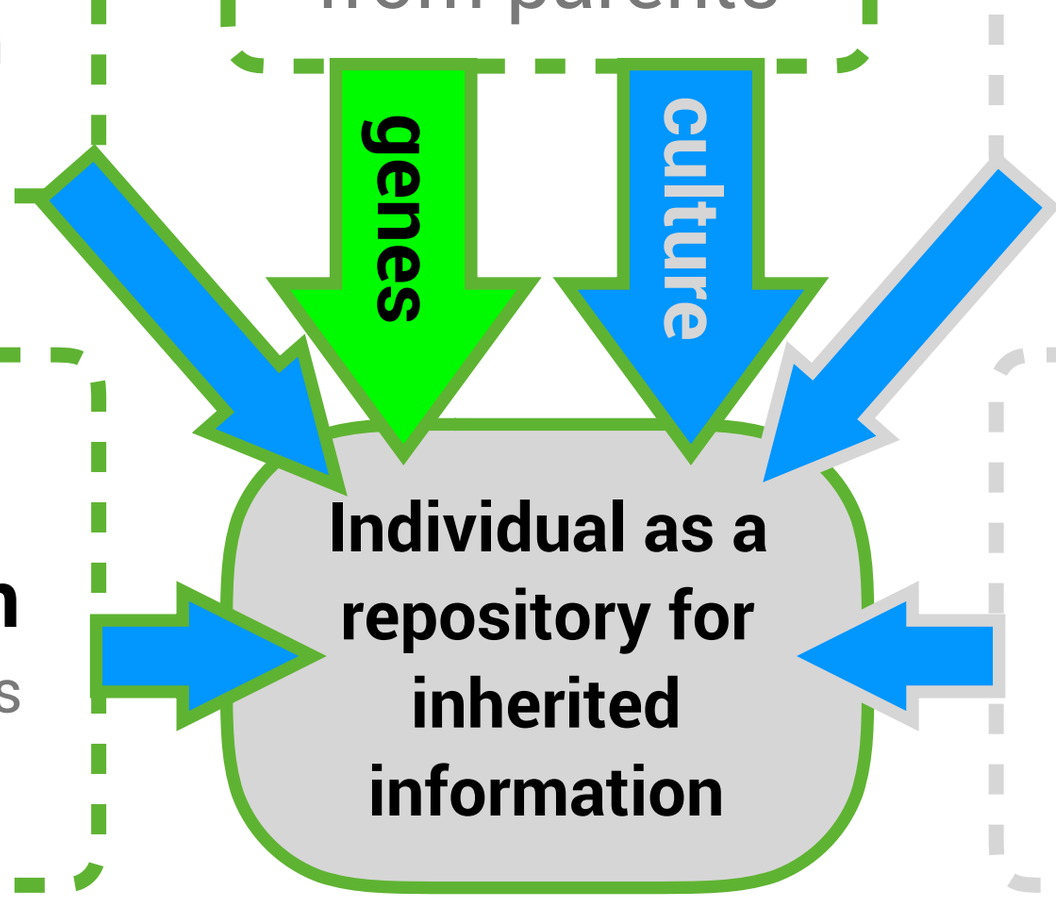
# Dual Inheritance Theory

**Oblique Transmission**
adults & institutions within one's own culture

**Vertical Transmission**
from parents

**Oblique Transmission**
adults & institutions outside one's own culture




**Horizontal Transmission**
peers within one's own culture

**Horizontal Transmission**
peers outside one's own culture

*Source:* Berry, John W. and James Georgas. 2009. Page 103 in Cultural Transmission. Cambridge University Press.

diagram *after* Berry & Georgas 2009

CHRISTOPHER X J. JENSEN
Associate Professor, Pratt Institute

# Three evolutionarily significant human (re)productive behaviors

B Breeding

P Propagating

C Creating

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Associate Professor, Pratt Institute

# Breeding

*Image Source:* Wikimedia Commons

## “breeding” is about passing on genes

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Associate Professor, Pratt Institute

# Propagating

## *What is culture? Where is culture?*

**behavior** → **cultural ideas** → 

**behavior**

"imitation"

Language allows for the transfer of cultural ideas without direct imitation

behavior is the phenotype affected by cultural ideas

*Image Source:* University of Miuchigan Faculty History Archive & Jensen personal archive

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Associate Professor, Pratt Institute

# Creating

## “Creative” behaviors contribute new cultural ideas


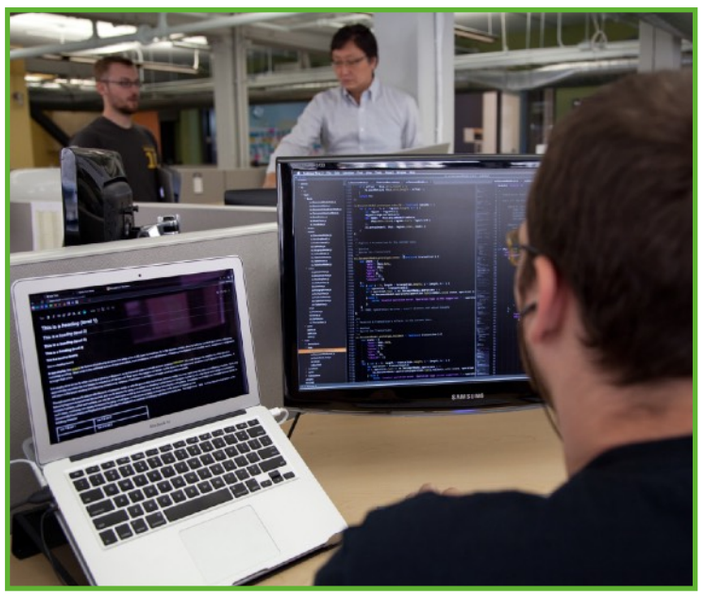

*Image Source:* Wikimedia Commons

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Associate Professor, Pratt Institute

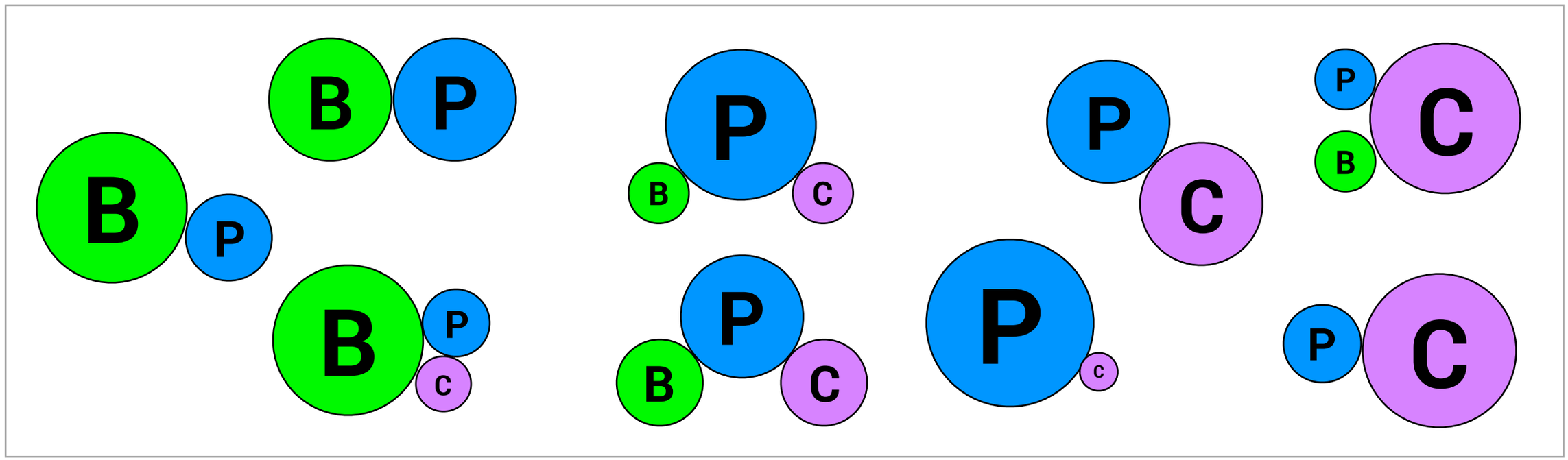
# A behavioral trade-off

Limited resources

## How to spend limited resources?
(time, materials, social connections)

*"pure" strategies*


*"mixed" strategies*



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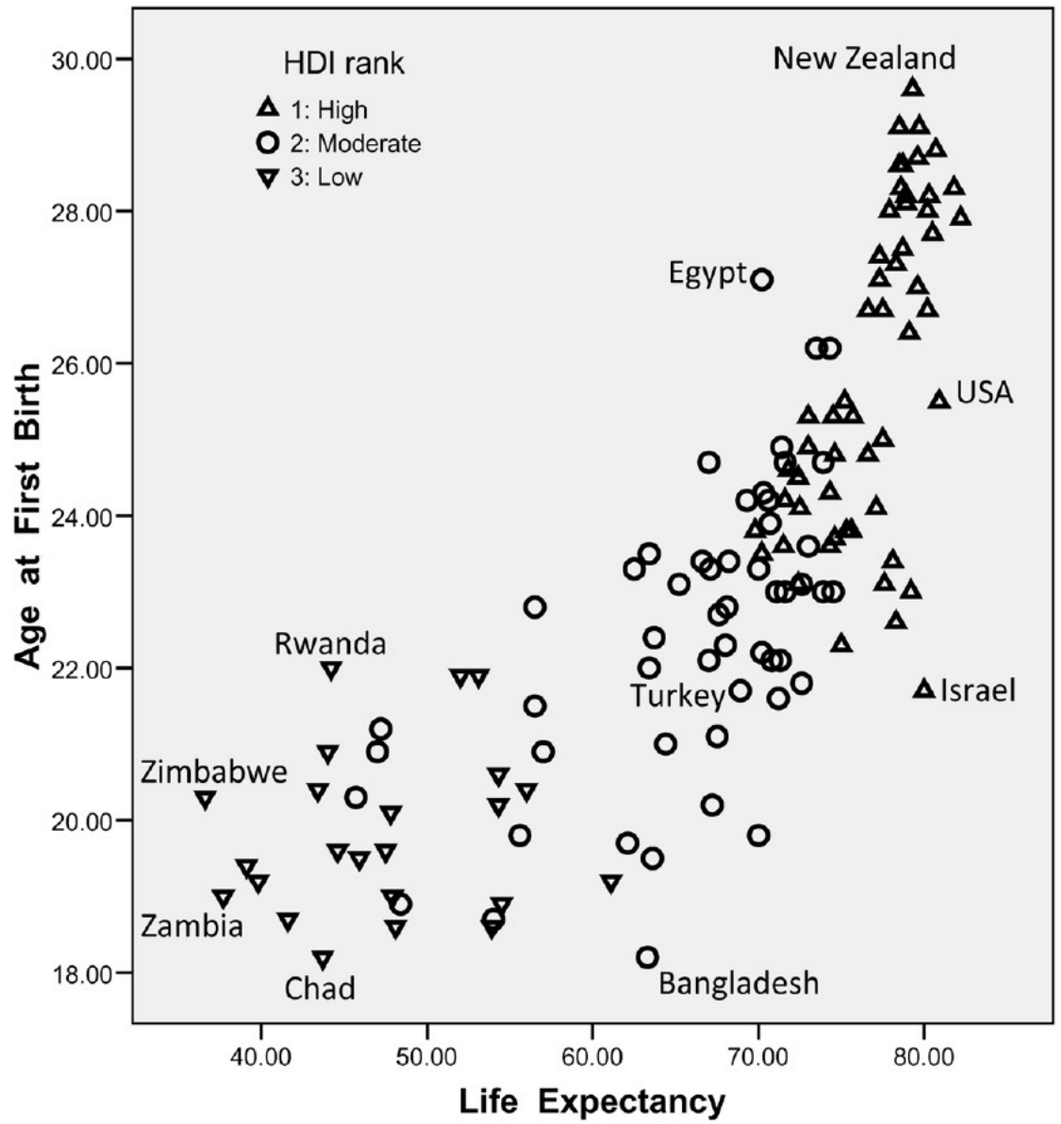
Associate Professor, Pratt Institute

# Environment Interacts with Genes

**Women's Age at First Birth Increases Nonlinearly With Life Expectancy at Birth (Smoothing Spline Fit, • = 2,000; $R^2$ = 0.677)**




(Low *et al.* 2008)

*Source:* Low, Bobbi S. et al. 2008. Influences on Women's Reproductive Lives. *Cross-Cultural Research* 42:201-219.

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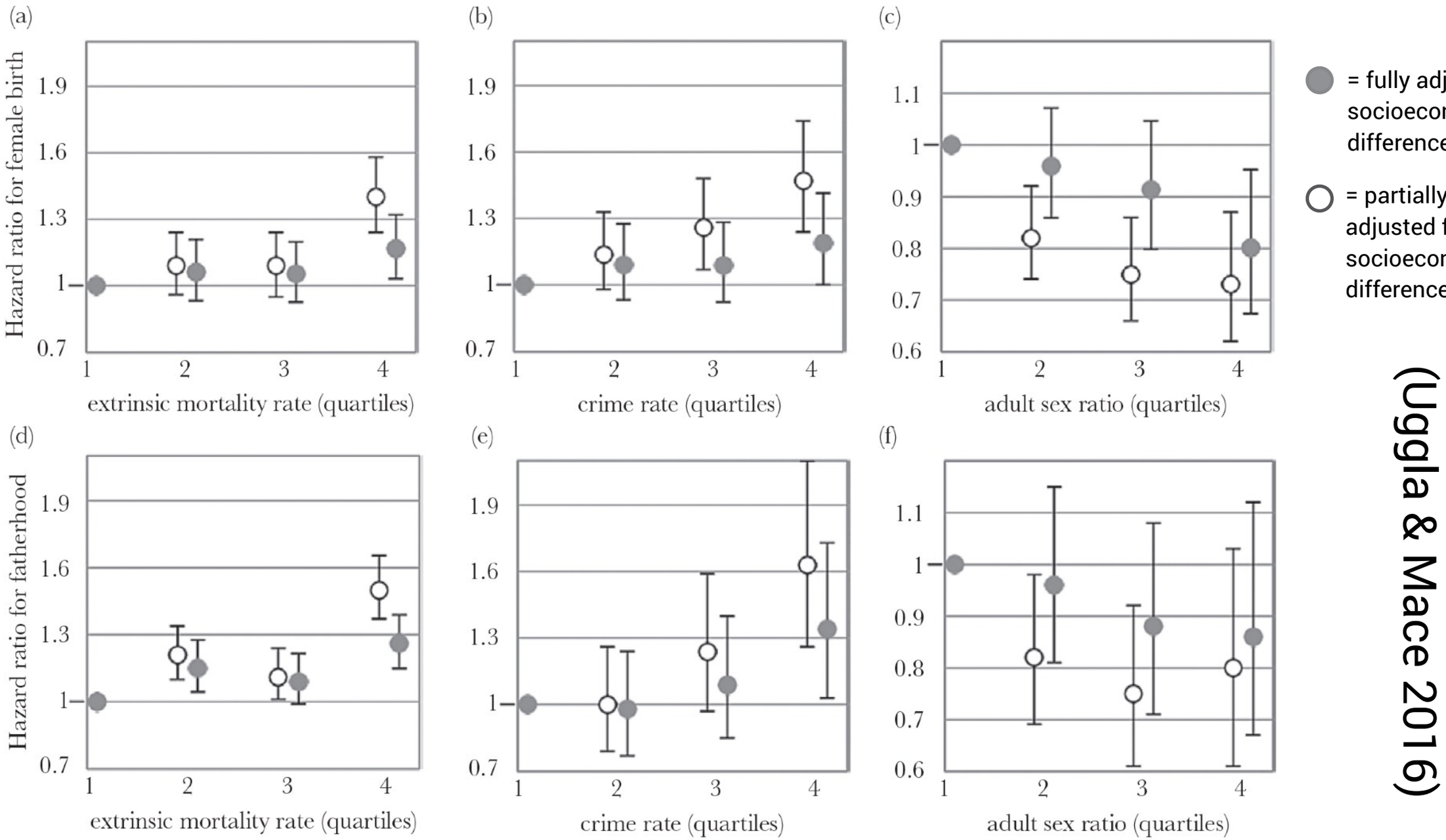
Associate Professor, Pratt Institute

# Environment Interacts with Genes




Source: Uggla & Mace 2016)

Source: Uggla, Caroline and Ruth Mace. 2016. Local ecology influences reproductive timing... *Behavioral Ecology* 27:158-165.

## Effect of “local ecology” on birth rates in Northern Ireland

CHRISTOPHER X J. JENSEN
Associate Professor, Pratt Institute

# Culture Competes with Genes

"Eighty-three countries had below-replacement fertility during 2010-2015, and in 25 of those countries, fertility was below 1.5 children per woman."

- U.N. World Population Prospects Report

2014 birth rates

South Korea = 1.25

Ukraine = 1.30

Japan = 1.40

Iran = 1.85

Singapore = 0.80

Denmark = 1.73

Azerbaijan = 1.91

Paraguay = 1.96

Cuba = 1.46

Costa Rica = 1.91

U.K. = 1.90

China = 1.55

*Source:* http://kff.org/global-indicator/total-fertility-rate/

*Source: UN World Population Prospects 2015*

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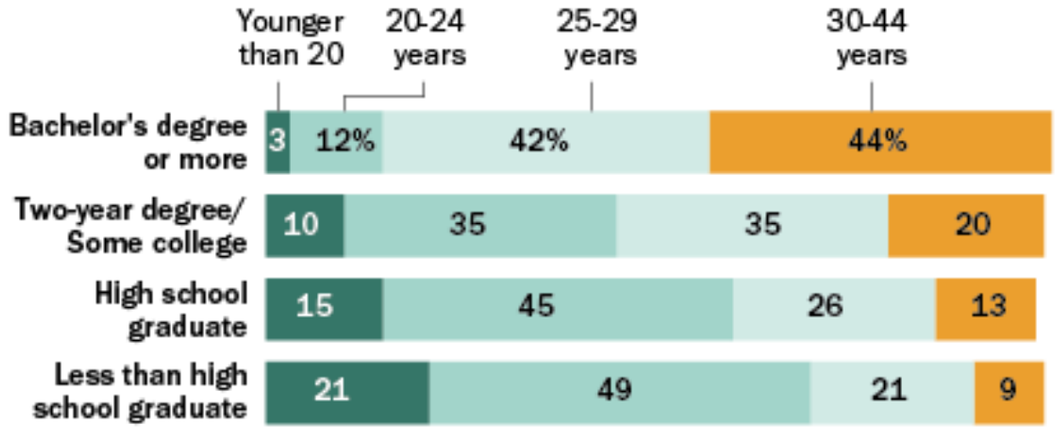
Associate Professor, Pratt Institute

# Culture Competes with Genes

**For More Educated Men, Fatherhood Starts Later**

*Share of men by age at birth of their first child and by educational attainment*



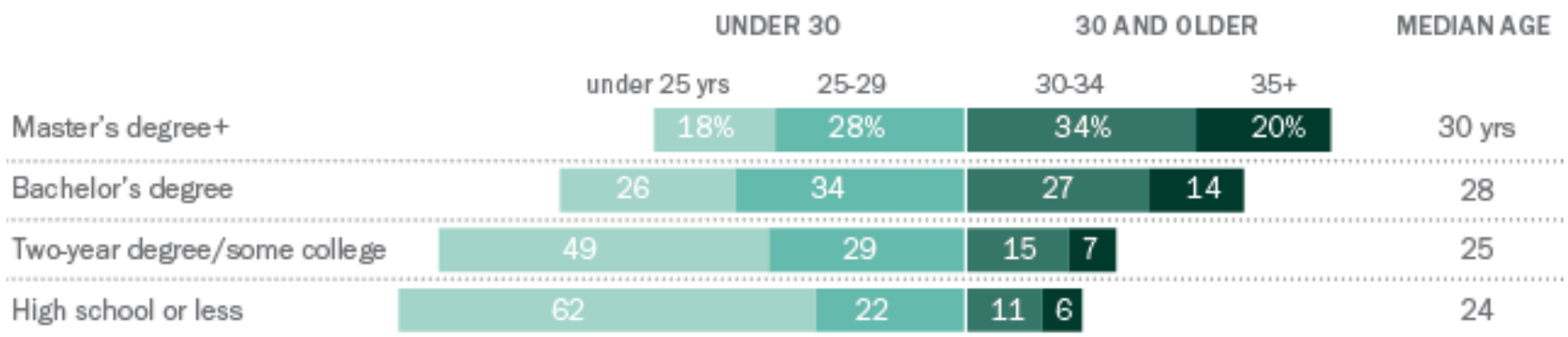

Pew Research Center

Educational attainment is a strong predictor of both later reproduction and lower overall reproductive output…

Why?

**For Most Highly Educated Women, Motherhood Begins in the Thirties**

*Age at birth of first child, by educational attainment*




Source: http://www.pewresearch.org/fact-tank/2015/06/19/college-educated-men-take-their-time-becoming-dads/

Source: http://www.pewresearch.org/fact-tank/2015/01/15/for-most-highly-educated-women-motherhood-doesnt-start-until-the-30s/


# The IPAT equation

$$I = P \times A \times T$$

**Impact**
*Total impact of humans on natural systems*

**Population**
*Number of humans on the earth*

**Affluence**
*Average per capita resource consumption*

**Technology**
*Average impact of human technologies*

with strong cultural influence!

a product of biological evolution

a product of cultural evolution

CHRISTOPHER X J. JENSEN

Associate Professor, Pratt Institute

# Moral questions about the sustainability of procreation

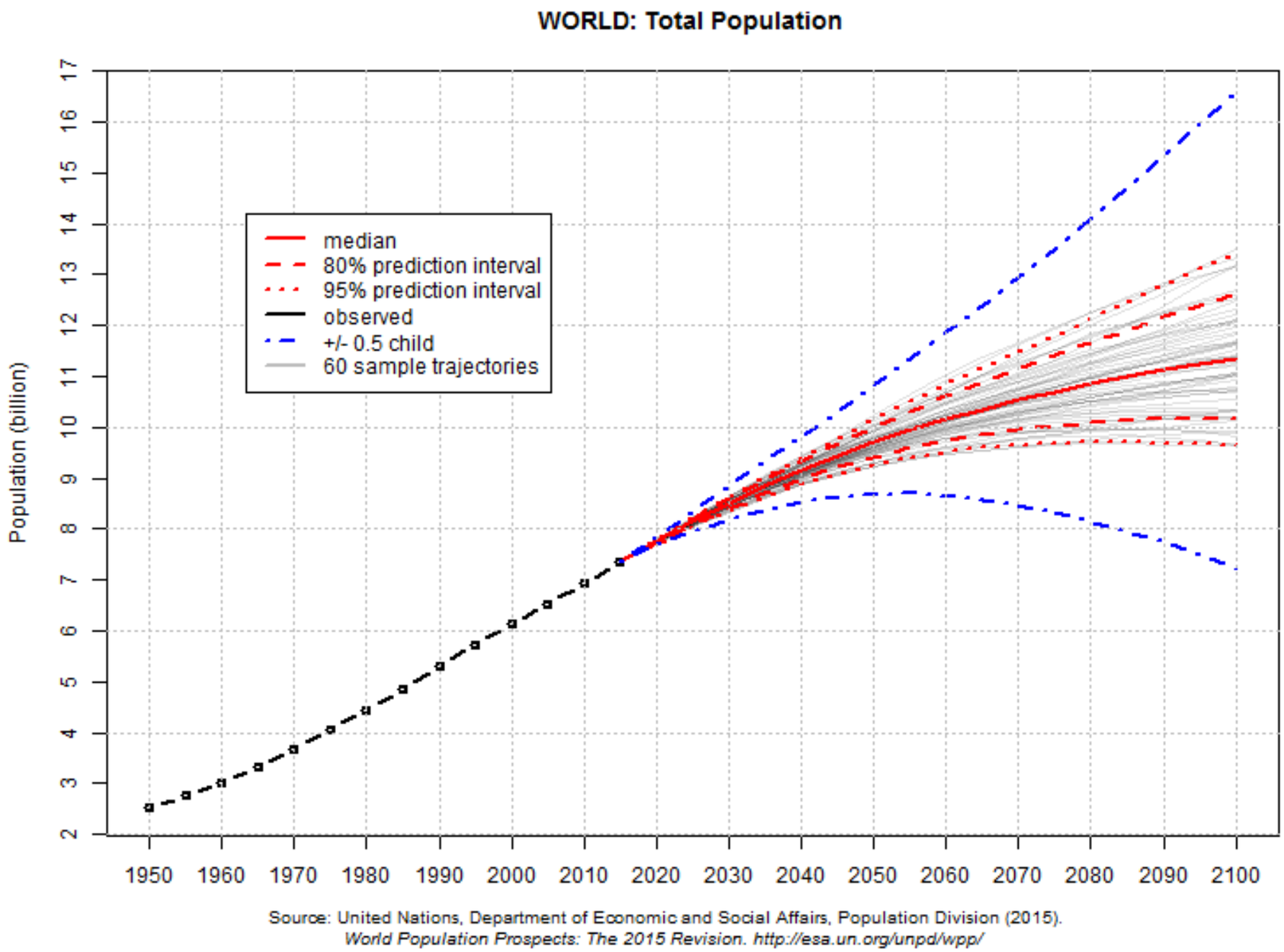



*Image Source:* https://esa.un.org/unpd/wpp/Graphs/Probabilistic/POP/TOT/

***How many children are we bringing into this world?***

CHRISTOPHER X J. JENSEN

Associate Professor, Pratt Institute

# Moral questions about the sustainability of procreation

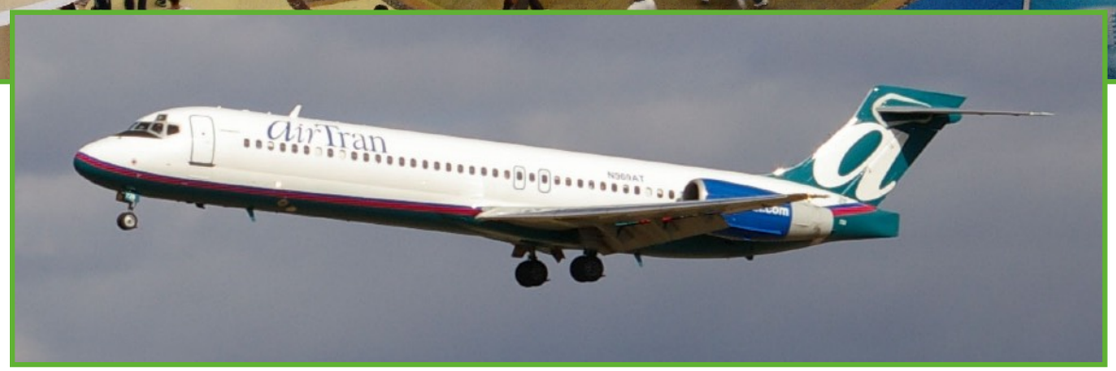



*Image Source:* Wikimedia Commons

## *How much will future generations consume?*

CHRISTOPHER X J. JENSEN
Associate Professor, Pratt Institute

# Moral questions about the sustainability of procreation

***What technologies will deliver resources to future generations?***

*Image Source:* Wikimedia Commons

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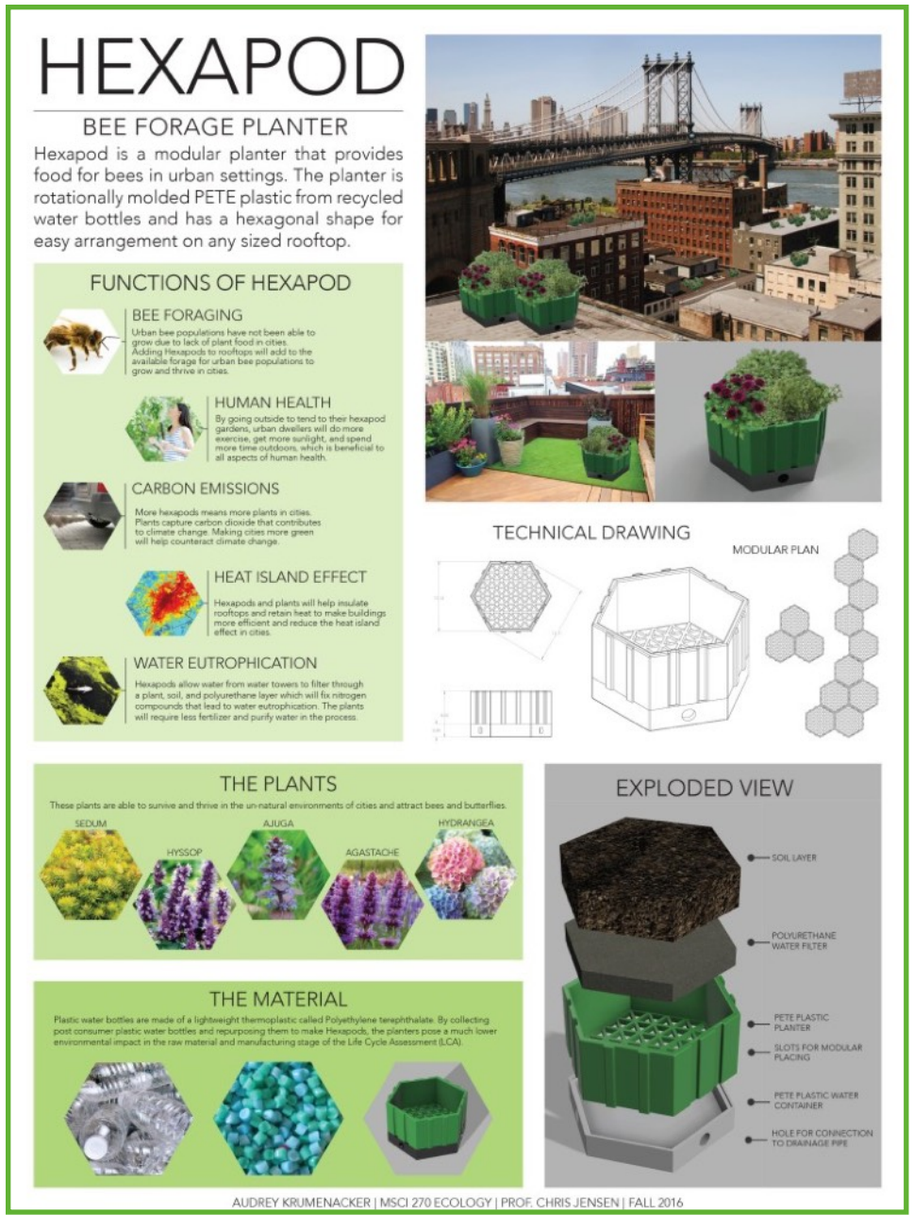
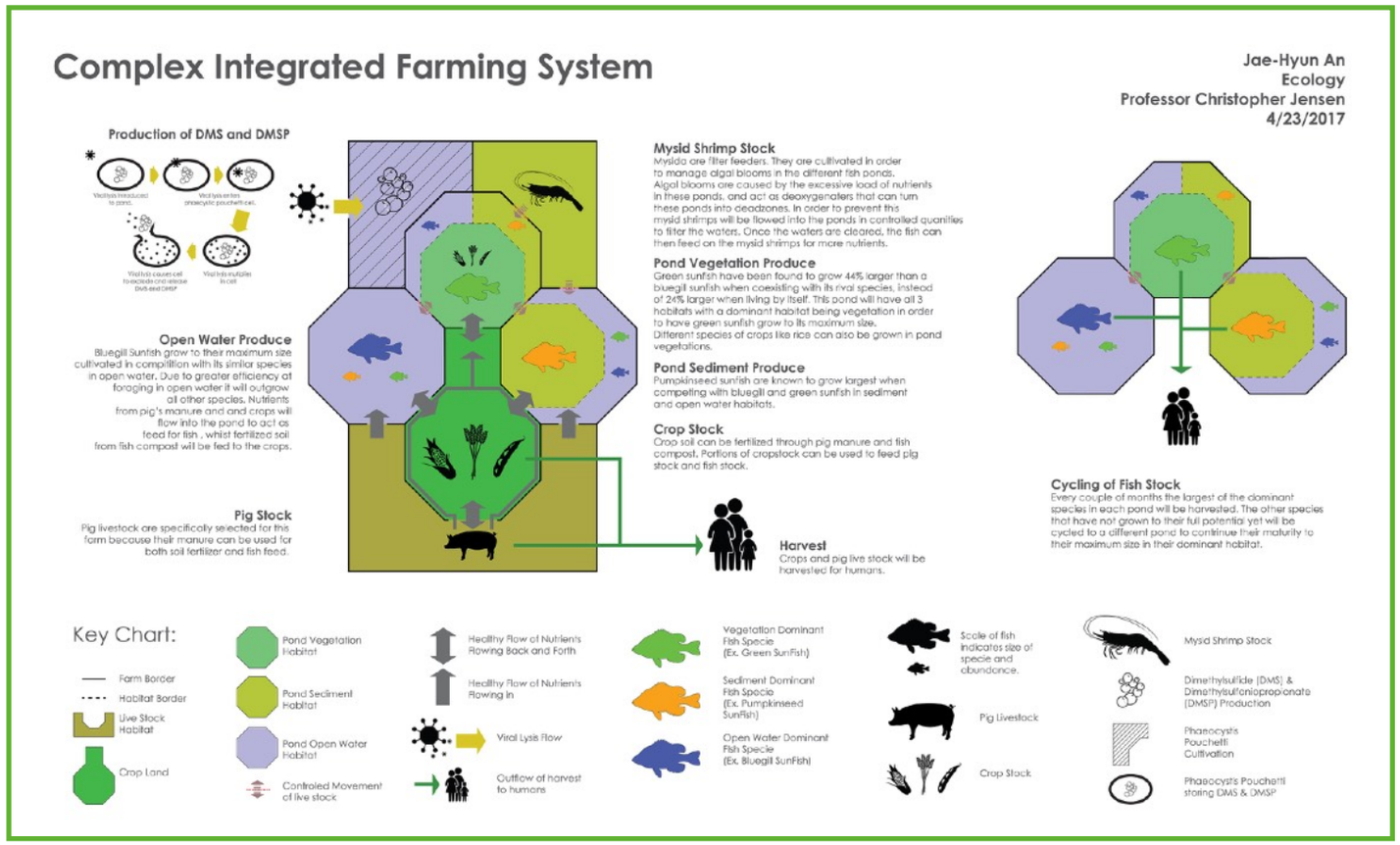
Associate Professor, Pratt Institute

# Moral questions about the sustainability of procreation

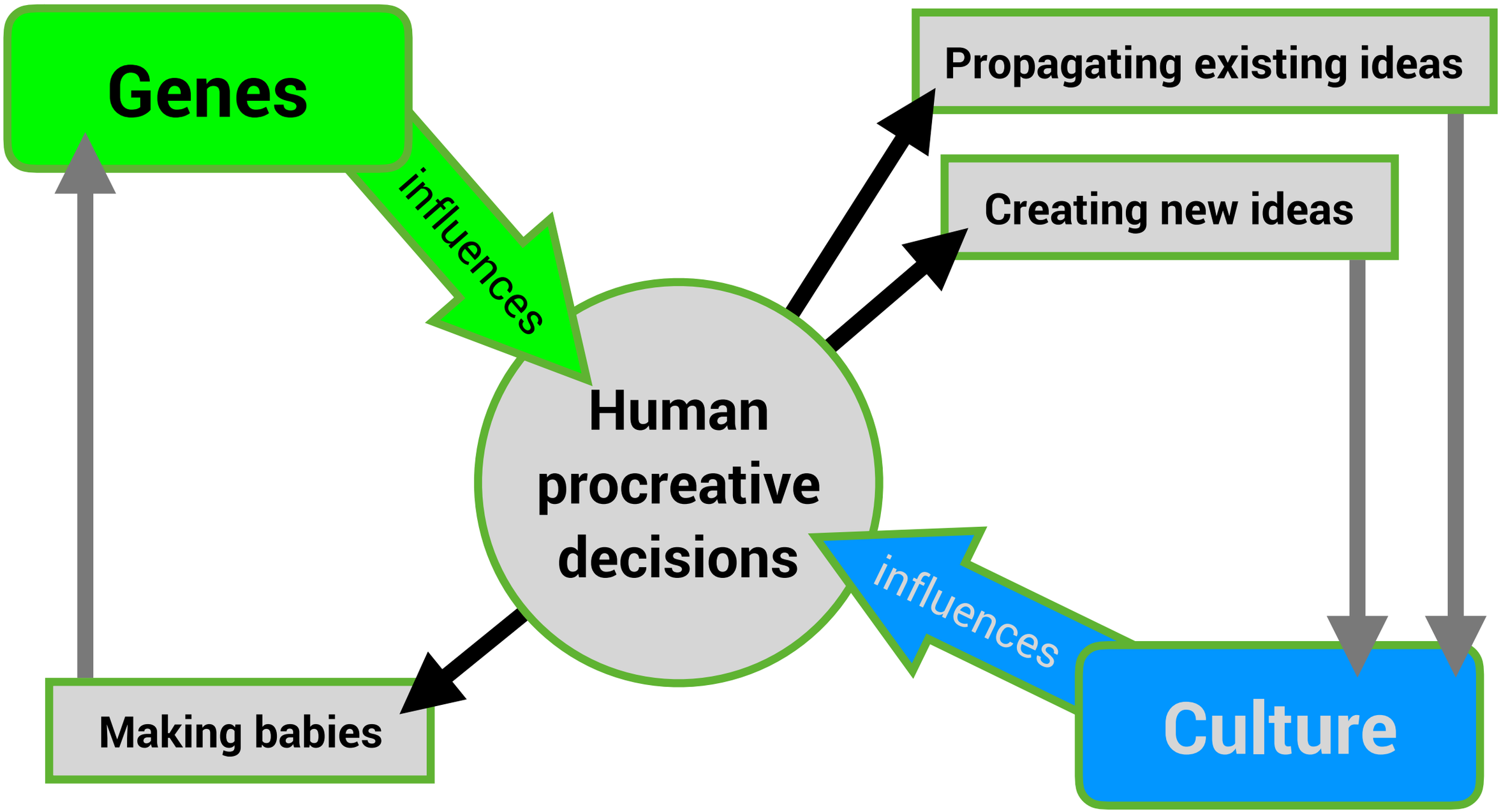



***What kind of culture is the current generation creating?***

CHRISTOPHER X J. JENSEN
Associate Professor, Pratt Institute

# Potential for Consilience?




# Thank you!

*I look forward to the panel discussion with all of you!*

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