

**So Q S**

## Race, Finances and Stress on Maternal Health

Project Card, Women in Research Health

In the US\*, black women are 3 to 4 times more likely than white women to die from pregnancy- or childbirth-related causes. This is one of the widest of all racial disparities in women's health. Racial bias in treatment practices, as well as higher levels of stress associated with discrimination (weathering) appear to be major factors.

\*cdc.gov/reproductivehealth/maternalinfanthealth/

3pts

**S C Q**

## Researching Incident of Earlier Menarche

Project Card, Women in Research Health

There is a global trend where young girls are experiencing their first period (menarche) earlier. A study\* has shown that earlier menarche correlates with increased insulin sensitivity. This may be a precursor to diseases like Type 2 Diabetes and other metabolic and cardiovascular diseases.

\*doi:10.7554/eLife.01604.001

3pts

**S C Q**

## Research on Gender Biased HPV Vaccine Usage

Project Card, Women in Research Health

Human papillomavirus (HPV) is the most commonly sexually transmitted infection in the world and the primary cause of cervical cancer. It infects both males and females, but according to one study\*, most Canadian parents were unaware that the vaccine could be administered to males.

\*doi:10.1186/s12889-016-3828-9

3pts

**S C**

## Physician's Sex and Patient Mortality Rates

Project Card, Women in Research Health

A study\* on 1.58 million elderly patients, has shown a 0.43% lower death rate if the treating physician was female versus male. Possible reasons for this may include adhering to clinical guidelines, and using more patient centred communication.

\*doi:10.1001/jamainternmed.2016.7875

2pts

**P C D**

## Amenorrhea in Astronauts

Project Card, Women in Research Health

Female astronauts need to consider ways to medically induce amenorrhea (i.e. stopping their period). They start this during training, sometimes years before spaceflight. This is done by altering hormone levels, which can be achieved with oral drugs, intrauterine devices, or implants under the skin.

doi:10.1038/npjmggrav.2016.8

3pts

**S Q**

## Access to Reproductive Health Study

Project Card, Women in Research Health

Research\* has shown that the US has experienced declines in abortion rates from 2011 to 2014 (by 14%). This appears to be due to access to contraception which results in fewer unintended pregnancies. As these services are scaled back, there are many who are concerned about the possible repercussions to women's health.

\*dx.doi.org/10.1363%2Fpsrh.12015

2pts

**P C D**

## Sex Bias in Stroke Research

Project Card, Women in Research Health

Stroke is the third leading cause of death for females in the US. In fact, one in five will experience a stroke in their lifetime. There are only a few therapeutic options right now, and some feel that this may be due to the fact that research has largely been done with only male rodent animals.

doi: 10.1042/CS20160841

3pts

**So Q**

## Matriarchal Family Structure and Global Health

Project Card, Women in Research Health

In Sub-Saharan Africa, diseases like HIV and diabetes affect women disproportionately. Furthermore, women tend to be the primary caregivers in the community and therefore their health is especially important. There is research\* that explores these nuances to better understand how empowering women's health can lead to better outcomes in the developing world context.

\*doi:10.1038/550S4a

2pts

**S Q I P**

## Sex Mosaic Characterization of the Brain

Project Card, Women in Research Health

Research\* suggests that human brains have a "mosaic" of features that are sometimes more common in males or more common in females. Overall, this suggests that "observed sex/gender differences in brain and behaviour, cannot be due to the brain itself being categorized as being either "male" or "female," but is rather a spectrum.

\*doi.org/10.1073/pnas.1509654112

4pts



**S Q C D**

## Ambien and Drowsiness in Females

Project Card, Women in Research Health

Research\* has found that when compared to males, females take longer to clear this insomnia drug from their system. This commonly resulted in next-morning impairment, affecting activities like driving due to drowsiness. This was discovered after the drug went to market due to underrepresentation of female subjects during various drug testing phases.

\*doi.org/10.1038/550S18a

**4pts**

<https://www.drugs.com/imprints/93-78-11131.html>

**G C**

## Congenital Adrenal Hyperplasia

Project Card, Women in Research Health

People with mutations at the CYP21A2 gene can have elevated levels of male hormones. This can, among other things, lead to ambiguous genitalia in females. This disease is one of many that are genetically determined and result in intersex outcomes.

doi:10.1002/humu.23351

**2pts**

<https://en.wikipedia.org/wiki/Testosterone>

**G C**

## Androgen Insensitivity Syndrome

Project Card, Women in Research Health

People with mutations at the Androgen Receptor (AR) gene can have resistance to male hormones. This can, among other things, lead to ambiguous genitalia in males. This disease is one of many that are genetically determined and result in intersex outcomes.

doi:10.1016/S0140-6736(12)60071-3

**2pts**

<https://commons.wikimedia.org/wiki/File:2AM9.org>

**S Q M G**

## Vaginal Microbiome Analysis

Project Card, Women in Research Health

The bacterial community in a vagina plays an important role in health. Much research has been done to characterize these communities to determine what constitutes a healthy "microbiome." This research aims to consider how having an unhealthy microbiome can contribute to diseases and health conditions.

DOI: 10.1097/AQG.0000000000001932

**4pts**

[https://commons.wikimedia.org/wiki/File:Vagina\\_\(microsa\).JPG](https://commons.wikimedia.org/wiki/File:Vagina_(microsa).JPG)

**G C M**

## Susceptibility To Autoimmunity

Project Card, Women in Research Health

Autoimmunity, where your immune system mistakenly attacks your own body, is much more prevalent in females than in males. For instance, females of childbearing age are 9 times more likely to suffer from systemic lupus erythematosus, a common autoimmune disease. The exact cause of these types of diseases are mostly unknown, but appear to have genetic, hormonal, and even environmental contributing factors.

<https://doi.org/10.1016/j.yfrme.2014.04.004>

**3pts**

[https://en.wikipedia.org/wiki/File:Healthy\\_Human\\_T\\_Cell.jpg](https://en.wikipedia.org/wiki/File:Healthy_Human_T_Cell.jpg)

**G C M D**

## Biofilms and Bacterial Vaginosis

Project Card, Women in Research Health

Biofilms, or adherent communities of bacteria, can form in the vagina. When there is excessive growth of these bacteria, a disease called bacterial vaginosis (BV) can develop. Biofilms are particularly difficult to kill with antibiotics, which can complicate the treatment of BV in females. BV persistence increases susceptibility to sexually transmitted infections.

doi:10.1097/QCO.0b013e32835c20cd

**4pts**

<https://commons.wikimedia.org/wiki/File:Vaginose-G15.jpg>

**I C Q**

## Hypoactive Sexual Desire Condition

Project Card, Women in Research Health

Up to one third of adult females in the US may experience prolonged distress due to lower-than-normal sexual desire. This has been classified as a mental disorder, and can even be treated with hormones in pre-menopausal females. However, it is also highly controversial. Critics of this condition argue that the distress may be caused by societal pressures on females.

doi:10.1136/medethics-2014-102596

**3pts**

<https://commons.wikimedia.org/wiki/File:1897>

**I C Q S**

## Osteoporosis Research

Project Card, Women in Research Health

Osteoporosis is a disease in which bones lose mass and become fragile. 80% of those diagnosed with this disease, are female, and statistics suggest that "one in two females over age 50 will break a bone." Osteoporosis is caused by a combination of factors, including lower estrogen levels when approaching menopause. Other factors include lower exercise, levels of vitamin D and calcium, and overuse of corticosteroids to treat other diseases.

doi.org/10.1007/s10067-018-4370-1

**4pts**

[https://commons.wikimedia.org/wiki/File:L1\\_2\\_Vertebral\\_fracture.jpg](https://commons.wikimedia.org/wiki/File:L1_2_Vertebral_fracture.jpg)

**So S Q**

## Motherhood Penalty Versus Fatherhood Bonus

Project Card, Women in Research Health

Looking at data from 1980 to 2014, research\* has shown that employers treat men and women differently after becoming parents. In general, a man's wage will rise, whereas a woman's wage will decrease. This gap seems to exist because of perceived gender roles within traditional family structures. However, this paper suggests that for high earning females, this effect is lessening over time, whilst the effect is actually more prominent in high earning males!

\*doi.org/10.1007/s13524-018-0712-5

**3pts**

[https://commons.wikimedia.org/wiki/File:The\\_Noun\\_Project](https://commons.wikimedia.org/wiki/File:The_Noun_Project)



So S Q

## Higher Motherhood Penalties For Less Privileged Women

Project Card, Women in Research Health

Females will experience wage penalties due to motherhood, however, research\* has shown that women with less privileged circumstances (including education level, professional status, race, skill sets, etc.) will actually suffer higher penalties. This means that motherhood penalties disproportionately compound the stresses that less privilege women already endure.

doi:10.1177/0003122416673598

3pts

Image by Yorlmar Campos, The Noun Project

So Q S

## Lower industry payments to female doctors

Project Card, Women in Research Health

A study\* showed that male doctors obtain higher amounts of industry payments and gifts (including grants, travel) when compared to their female counterparts. For instance, in surgery, males received 28% more in such payments. Although the reasons are unclear, one possibility is that female physicians are targeted less due to males tending to be of higher influence in the medical community.

\* doi:10.1001/jama.2017.3091

3pts

Image by Luis Prado, The Noun Project

So Sociology



Image by Chelsea O'Byrne

So Sociology



Image by Chelsea O'Byrne

So Sociology



Image by Chelsea O'Byrne

So Sociology



Image by Chelsea O'Byrne

So Sociology



Image by Chelsea O'Byrne

So Sociology



Image by Chelsea O'Byrne

P Physiology



Image by Chelsea O'Byrne



# M Microbiology



# M Microbiology



# M Microbiology



# M Microbiology



# M Microbiology



# P Physiology



# P Physiology



# P Physiology



# P Physiology





## G Genetics



## G Genetics



## G Genetics



## G Genetics



## G Genetics



## G Genetics



## S Statistics



## S Statistics



## S Statistics









## S Statistics



## D Drug Testing



## D Drug Testing



## D Drug Testing



## D Drug Testing



## D Drug Testing



## Q Questionnaires and Surveys



## Q Questionnaires and Surveys



## Q Questionnaires and Surveys





Image by Dick Vincent

Image by Dick Vincent

Image by Dick Vincent

## An illustration of a classroom scene. A male teacher with dark hair and glasses, wearing a blue suit, stands at the front of the room pointing to a large sheet of paper on an easel. The paper has several horizontal lines, suggesting a list or a page of text. Three students are seated at a large, dark red wooden table. On the left, a girl with dark hair in a ponytail, wearing a red shirt and a patterned cardigan, is looking towards the teacher. Next to her, another girl with dark hair, wearing a red shirt, is also looking towards the teacher. On the right, a boy with grey hair, wearing a red shirt and a brown vest, is looking towards the teacher. The table has various items on it, including a white pitcher, a small white cup, and some papers. In the background, there is a blue oval shape on the wall and a potted plant with green leaves and orange flowers on the right side. The overall style is simple and colorful, with a focus on the interaction between the teacher and students.

Image by Dick Vincent

Image by Dick Vincent

## An illustration of a woman in a blue suit standing and pointing to a flip chart with horizontal lines. She is addressing three people seated around a large, thick, red table. The seated individuals include a woman with dark hair in a red top, a woman with dark hair in a patterned top and red skirt, and a man with grey hair in a brown jacket and red chair. The table has a large white vase and some papers on it. In the background, there is a blue oval shape and a potted plant with green leaves in an orange pot. The style is simple and illustrative.

Image by Dick Vincent

Image by Dick Vincent

## A colorful illustration by Dick Vincent. A woman in a blue suit stands at the front, pointing to a flip chart with horizontal lines. Three people are seated around a large, thick red table. On the left, two women are seen from the side, looking towards the front. On the right, a man with grey hair, wearing a brown vest over a white shirt, looks towards the flip chart. The table has a white pitcher and several small white cups on it. A potted plant with green leaves and orange pots sits on the right. The background is a plain, light-colored wall with a blue oval shape at the top. The style is simple and illustrative.

Image by Dick Vincent

Image by Dick Vincent

## An illustration of a classroom scene. A male teacher with dark hair, wearing a blue suit and a yellow shirt, stands at the front of the room pointing to a whiteboard. The whiteboard has several horizontal lines representing text. Three students are seated at a large, reddish-brown table. On the left, a girl with dark hair in a ponytail, wearing a red shirt and a grey patterned vest, is looking at the whiteboard. Next to her, a boy with dark hair, wearing a red shirt, is also looking towards the whiteboard. On the right, a boy with grey hair, wearing a red shirt and a brown vest, is looking at the whiteboard. The table has various items on it, including a white pitcher, a small white cup, and some books or papers. In the background, there is a blue oval shape representing a window or a light source, and a green potted plant with orange pots. The illustration is done in a simple, stylized manner with bold outlines and flat colors.

Image by Dick Vincent



## Q Questionnaires and Surveys



## Q Questionnaires and Surveys



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study





## I Imaging



## I Imaging



## I Imaging



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study



## C Clinical Study









POSITIVE



## #metoo: awareness is power

In the past 20 years, and especially since the explosion of the #metoo movement in 2017, awareness about sexual harassment and assault has increased. Events, forums and campaigns have been held worldwide to take resolutions and programs to protect against gender based violence and inequality.

**This card can be used with the Harassment and assault in scientific fieldwork modifier card. This card will give the dice roller a +50% bonus on their % roll. You may also give this card to another player in need for a +2 point bonus.**

POSITIVE

+2pts

Image by Luis Prado



NEGATIVE



## Biased family leave.

STEM women's careers suffer disproportionately from taking family leave. Many fathers do not take paternal leave even when it is available.

*You may keep this card in your hand until use. When given to another player, that player must skip their next two turns. Card then returns to the BURN pile.*


NEGATIVE



doi.org/10.1038/s41559-018-0747-4 Image by Luis Prado



POSITIVE



## Progressive parental leave policy


Some countries have enacted policies that allows both parents to take parental leave at the same time. These kinds of policies aim to even out the disadvantages in career advancement that come with extended absences from work.

**This card can be used to negate the effects of the Biased family leave modifier card. You may also give this card to another player in need for a +2 point bonus.**


POSITIVE

+2pts

Image by Luis Prado



POSITIVE



## Mentors are great.


Women have blazed this trail before you, and many of them want to help others succeed.

**This card can be used to negate the effects of any negative modifier card. If the modifier card involves a % roll, use of this card provides a +20% bonus. You may also give this card to another player in need for a +2 point bonus.**

POSITIVE

+2pts

Image by Irene Hoffman



POSITIVE



## Diversity makes better research.

Evidence has shown that mixed-gender teams produce research articles perceived to be of higher quality than single-gender teams.

**This card can be used to negate the effects of any negative modifier card. If the modifier card involves a % roll, use of this card provides a +20% bonus. You may also give this card to another player in need for a +2 point bonus.**

POSITIVE

+2pts

Image by Luis Prado



## Credits


**Research Team:** Shannon Percival Smith and David Ng.

**Game Design Team:** Shannon Percival Smith and David Ng. With thanks to Sidney Ang, Genevieve Leduc-Robert, Lu Li, and Sam McKinnon.


**Art by** Chelsea O'Byrne, Fotini Tikkou, Dick Vincent, and Lan Yan. Card back design by Suzanne Norris, Phylo logo by Haley Fiege.

**This project was funded** by the Michael Smith Laboratories, UBC.


Game rules



Cards with art by SG, RI, RS, EW, SW & PZ



All other cards, and card backs



For more information about the PHYLO card game, please visit <http://phylogame.org>



## RULES

01

### The Women in Health Research Deck

Please note that a "how to play" video for the Women in STEM game (which is very similar to this one) is available at <http://phylogame.org> under the "play" section)

Although patriarchy's stranglehold on science and engineering is ever-weakening, it still causes significant hurdles for scientists and engineers worldwide. In this game, you get to explore some of the scientific research that focuses on health research from a gendered perspective, as well as social science research that examines some of the equity challenges that women still face in health (specifically) and STEM (generally) related careers.

### Objective

The objective of the game is to obtain as many points as possible by completing projects. The player with the most points at the end of the game is the winner. Points are gained by completing *Project Cards*. In order to complete a *Project Card*, the appropriate combination of *Resource Cards* must be collected. Points from any **incomplete Project Card** is subtracted from your total score at the end of the game.

## RULES

02

### The Deck

This deck contains 115 cards which includes 21 *Project Cards*, 94 *Resource Cards* (82 *Discipline Cards* and 12 *Modifier cards*). This game is best played with 3 to 4 players, but can be played with 2.

Length of playing time is approximately 30 to 45 minutes but this can be easily adjusted by lowering the number of research *Project cards* used at the start of the game (see below). Note that the first few games tend to take a bit longer as players become more familiar with the content.

Note that playing with fewer *Project Cards* at the start can shorten the length of the game. A 30 minute game can be played by using only 10 *Project Cards* at the start.

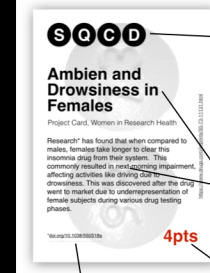
### Research "Project Cards":

Players obtain points upon completion of *Project Cards*. Each of these cards requires a specific combination of *Discipline Cards* which must be collected and kept with the project in order to be completed.

Usually, the number of *Discipline Cards* required to complete a project is the number of points collected by the player upon completion. At the end of the game, **incomplete Project Cards** result in negative points equal to the point value of the card.

## RULES

03



Symbols for resources (disciplines) required for project completion (discipline and achievements)\*

Name and some interesting research notes.

Number of points won if the project is completed; or points lost if incomplete by end of the game.

Link to peer reviewed reference(s)

### Resource Cards:

*Resource Cards* are mostly *Discipline cards* (*Statistics, Drug Testing, etc*) which contribute towards completing *Project Cards*.

### Modifier Cards:

These cards generally reflect issues related to gender equity and have effects that can change how a player completes their *Project cards*. These effects are explained in the card text, so it is important to make sure you read them carefully.

## RULES

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There are two types of *Modifier Cards*: *NEGATIVE* and *POSITIVE* ones. Both types are colour coded (although note that there are two *POSITIVE* cards that have **all** the colours - rainbow like).

*NEGATIVE* cards highlight challenges in gender equity and make it harder for a player to finish projects. These are shuffled into the resource card deck at the beginning of the game, and are picked up like other cards during the game. Note that some must be played immediately (on yourself or given to another player), while some can be held in your hand for later use (read the card text).

*POSITIVE* cards showcase progressive concepts that basically counter the *NEGATIVE* cards. These too are colour coded (i.e. the **red** *POSITIVE* card can be used to act against the **red** *NEGATIVE* card; the rainbow coloured ones are good with any of the *NEGATIVE* cards). Although, there are 7 of these *POSITIVE* cards in total, each player will only get **one** (randomly) at the beginning of the game. The others will be immediately placed in the burn pile and are therefore out of the game.

**Disciplines Cards:** The field(s) of research that the *Project Card* requires. Note that this game has 9 different disciplines.

## RULES

05

### Set Up

#### The Playing Field

There are 4 main card "piles" in the game.



- Resource Card pile** – contains the shuffled up *Resource Cards* (*Discipline* and *NEGATIVE Modifier Cards*) face down.
- Project Card pile** – contains the *Project Cards* face down (the number you start with affects how long the game will last).
- Discard pile** – contains discarded cards face up (at the beginning, this will be empty).
- Burn pile** – This pile will also collect face down *Discipline Cards* that were used to complete *Project Cards* as well as *Modifier Cards* (both *NEGATIVE* and *POSITIVE*) after use. (At the beginning, this pile will only contain unpicked *POSITIVE* modifier cards)

Once the *Resource Card* pile is completely used up, the *Discard pile* (minus the top card) is shuffled and used to replenish the new *Resource Card* pile.

## RULES

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### Playing

To start the game, place all the *Resource Cards* (*Discipline cards* and *NEGATIVE modifier cards*) and *Project Cards* face down in two separate piles between the players as shown in the page before. As the game progresses, the *Discard* pile and the *Burn* pile will grow in size.

Each player starts with a hand of two *Resource Cards*, one *Project Card*, and one *POSITIVE Modifier Card*. If you pick up a *NEGATIVE Modifier Card* at the beginning, return it to the middle of the *Resource* pile - unfortunately, this also means you will be starting with a smaller hand. Every turn consists of three basic phases: A draw phase, an action phase and a discard phase.

**1. Draw:** At the start of their turn (youngest player goes first), the player draws two cards, in any combination, from the *Project Card* pile, the *Resource Card* pile or the *Discard* pile (ie. 2 cards from the *Resource Card* pile or 1 card each from the *Project Card* and *Resource Card* pile, etc). The player must pick up both cards before looking at either of them. Only the top cards in the *Discard* pile (which are visible) can be drawn (ie. you cannot look through *Discard* pile).

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**2. Action:** The player can now choose to do as many of the following actions during their turn.

#### i) Start and/or work on a project.

To start a project, place a *Project Card* face up in on the table. By doing this, you commit to finishing the card. If you do not finish it by the end of the game, you will be deducted the point value of the project. There is no limit to the number of projects you can work on at the same time, but don't forget that they are worth negative points if not finished. Finishing a project card, involves collecting required *resource cards* and placing them beside (or on) the *project card* on the table to keep track.

#### ii) Complete a project.

A project is completed when you have acquired all the *Resource (Discipline) Cards* needed for the project. Take the completed *Project Card* and set it aside to keep track of your points. Place the associated *Resource Cards* face down in the *Burn* pile.

#### iii) "Negative" Modifier Cards.

*NEGATIVE Modifier Cards* impede a player's ability to finish projects. If you pick one up, read the card text carefully. Many require you to use them on yourself immediately, but there are a few that allow

## RULES

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you to give the *NEGATIVE card* to another player (some you can even keep to give later).

If you happen to have the corresponding *POSITIVE card* (i.e. the same colour or a rainbow), you can use this on yourself to help counteract the *NEGATIVE* effect. If another player has the corresponding *POSITIVE card* (i.e. the same colour or a rainbow), they can also choose to let the affected player use the card. This act of sharing rewards the player giving the card an extra 2 points to their total. In other words, by helping out another player, there is a +2 bonus to your point total. The player who shares this card for this purpose can set it aside to keep track of their points (this is also why the *POSITIVE cards* have a +2pt written on them).

**3. Discard.** At the end of your turn, you must discard cards from your hand into the *Discard* pile face up if your hand size is LARGER than the number of *Project Cards* you have **in progress**. Your hand number **does not** include the *POSITIVE card* you received at the beginning of the game.

For example, if you are working on one *Project Card*, you can only hold one card at the end of your turn. If you have no active *Project Cards* (completed *Project Cards* do not count), you must

## RULES

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discard your entire hand. Note that *Project Cards* can only be discarded if they are in your hand (ie. Active ones on the table **cannot** be discarded).

### Ending the Game

When the last *Project Card* is drawn from the *Project* pile, the next player to complete a *Project Card* starts the **end game**. Here, when the next *Project Card* is finished, all players get one more turn before the game ends. Then, players tally up all their points: positive points for completed *Project Cards* and negative points for unfinished *Project Cards* left on the field. The player with the most points wins the game.

For example: Dave completed a 4-point card, a 2-point card, and has an unfinished 3-point card. He gets 4 + 2 - 3 = 3 points at the end of the game.

### Using the Dice

This game includes two 10 sided dice, which are used for some of the cards. One has sides with numbers from 0 to 9, the other 00 to 90 (in increments of 10). Basically, when you roll both dice, you add then numbers up to achieve a percentage value (i.e. a roll of "6" and "40" is equal to 46%. Note that a roll of "0" and "00" is usually indicative of 100%)