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From the Editors
LETTER FROM THE EDITORS

NSURJ is excited to present:
Volume 2 | Issue 1 | Spring 2016

The Nevada State Undergraduate Research Journal (NSURJ) is here to encourage, recognize, and celebrate undergraduate research in every field by being an outlet for those students who go above and beyond their required studies to increase the human capacity for knowledge. Nevada is seeing a rise in students taking the initiative to conduct research and analyze the world around them and as such Nevada needs a research journal that caters to undergraduate research in a professional manner that sets a high standard and upholds the integrity of the highest journals.

This year, we as the editors performed outreach to authors, students, and faculty at many universities in order to increase the size of the NSURJ team, obtain more submissions, and expedite the process of reviewing an article. Although every person we met was incredibly enthusiastic about NSURJ, the people we spoke to at club fairs, orientations, classes, and on our travels had a limited understanding of what NSURJ is and what we want it to become in the upcoming years. This made our journey all the more important to conduct further outreach and along the way we have gained a staff of dedicated junior editors and peer reviewers who take their responsibilities seriously and possess the same dream for the future of this journal.

During the publishing of the first issue, a precedent was established that NSURJ was a truly interdisciplinary academic work. We are dedicated to maintaining both rigor and high standards. Everyone involved put forth a maximum effort to ensure this journal was not only interdisciplinary, but represented the highest quality of research. What you see in this issue is the culmination of an increase in the number of students submitting their work from both northern and southern Nevada as well as excitement and support from students, faculty, and administration throughout the state.

We at NSURJ understand that the journal will continually grow and improve from its current form. We hope it will grow in both size and scope as we attempt to shape it for upcoming years and set it on a successful pathway for years to come. We have a large dream, but we have a dedicated staff and an even more dedicated student population that have the tools to make every aspiration a realization. For the future, we hope we get an increasing rate of high quality submissions, publish multiple issues in a single year, receive manuscripts from all institutions in the state of Nevada, and continue to help this state become a beacon for highly regarded research institutions. It is an aspiration we share and a high bar to set, but we know to our full comprehension it can become a reality.

Our time as the editors for this journal has been a gift to learn and share with others. We want to thank everyone who participated in this creation and will always continue to encourage, recognize, and celebrate those who follow their passion to push the boundaries of academia by conducting research and adding to a body of knowledge.
NATURAL SCIENCE

Mathematics
Mathematics
Modeling and Simulation of Transition Probabilities

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Abstract: Transition probabilities are defined as the probabilities of changing state in a system. We introduce a mean reverting and non-negative transition process where the probabilities of leaving a given state must sum to a whole. We develop and implement a C++ Monte-Carlo program and present numerical examples, which can be used to study the model parameters.

Introduction:
A transitional probability is the probability of transitioning from one state to another at a particular instant of time. Applications of systems with transitional states are widespread. As an example from mathematical finance, we note that credit risk can be modeled by transition probabilities (cf. ref. [1]). A notable feature of many such applications is the changing nature of the transitional probabilities themselves, which evolve over time. To this end, we have developed a mathematical model that allows each transitional probability of a system to evolve over time, while still reverting to a predetermined mean value at a given rate. By developing approximation procedures based on the Monte-Carlo method (i.e. Euler approximation), we are able to visualize the relative effects of the parameters in order to fine-tune our model.

The act of changing state in a system is defined as a transition; the probabilities of state changing are called transition probabilities (cf. ref. [4], [7]). With this in mind, we consider \( m \) states, where the transition probability from a given state to a state \( i \) satisfies the following conditions:

\[
\begin{align*}
(1) & \quad 0 \leq P_i \leq 1 \\
(2) & \quad P_1 + P_2 + \cdots + P_m = 1
\end{align*}
\]

Condition (2) means that the probabilities of leaving one fixed, given state moving to another must sum to unity. Our objective is to obtain a mean reverting process for the transition probabilities that satisfies (1)-(2).

Two meaningful examples that guide our development are:

Example 1. An Ornstein-Uhlenbeck process [6] describes the velocity \( dX(t) \) of a very heavy Brownian particle under the influence of friction at time \( t \), which over time tends to drift towards its long-term mean \( \bar{X} \) (a so-called mean-reverting process)

\[
dX(t) = \alpha(\bar{X} - X(t))dt + \sigma dW(t)
\]

where \( \alpha > 0 \) is the rate of mean reversion, \( \sigma > 0 \) is the dispersion, and \( W(t) \) is a Wiener process, which is a continuous-time stochastic process (also known as standard Brownian motion).

Example 2. The Cox-Ingersoll-Ross model (CIR) [3] describes the short-term interest rate \( X(t) \) at time \( t \) as given by:

\[
dX(t) = \alpha(\bar{X} - X(t))dt + \sigma \sqrt{X(t)}dW(t)
\]

where the dispersion \( \sigma \sqrt{X(t)} \) avoids the possibility of the interest rate \( X(t) \) being negative.

Model of Transition Probabilities:
Motivated by the Ornstein-Uhlenbeck process and the CIR model, we define the following system of stochastic differential equations (SDE): given the current state, the transitional probabilities to states \( i=1,2,\ldots,m-1 \) are defined by:

\[
\begin{align*}
(5a) & \quad dP_i(t) = \alpha_i \left( \bar{P}_i - P_i(t) \right) dt + \\
& \quad \sigma_i \sqrt{P_i(t)} \beta_i (P_1, P_2, \ldots, P_{m-1}) dW_i(t),
\end{align*}
\]

for \( 0 < t \leq T \), such that

\[
(5b) \quad P_i(0) = p_i,
\]

where the initial probability of being in state \( i \) is \( 0 \leq p_i \leq 1 \), the dispersion is \( \sigma_i > 0 \), the rate of reversion to the mean \( \alpha_i > 0 \), \( dW_i(t) \) is a Wiener process, and
\[ \beta_j(P_1, P_2, \ldots, P_{m-1}) = \begin{cases} 1 & ; j < m - 1 \\ \sqrt{1 - (P_1 + P_2 + \cdots + P_{m-1})} & ; j = m - 1 \end{cases} \]

ensures the transition probabilities are each less than one. Finally, for \( j = m \), we set

\[ P_m(t) = 1 - (P_1(t) + P_2(t) + \cdots + P_{m-1}(t)), \]

which assures that the sum of the transition probabilities is one as required by (2).

For modeling transitional probabilities, it is essential that (1) and (2) be enforced. Motivated by examples (1) and (2), our contribution is the inclusion of \( \beta \) which imposes the constraints (1) and (2) upon the transitional probability dynamics (5a). That is, we ensure that \( 0 \leq P_i \leq 1 \). This is seen as follows:

For \( i = 1, 2, \ldots, m-1 \), the transition probability \( P_i \) must be non-negative for the term \( \sqrt{P_i(t)} \) in (5a) to be defined. Likewise, the transition probability \( P_i \) is prevented from being greater than one by the square root term in (6) upon noting that \( P_i \geq 0 \), for \( i = 1, 2, \ldots, m-1 \). For \( i = m \), the \( \beta_i \) term requires:

\[ 1 - (P_1 + P_2 + \cdots + P_{m-1}) \geq 0 \quad \text{or} \quad P_1 + P_2 + \cdots + P_{m-1} \leq 1 \]

such that \( P_m \geq 0 \) by (7).

Also, \( P_m \leq 1 \) since \( P_i \geq 0 \) for \( i = 1, 2, \ldots, m-1 \). It follows then that conditions (1) and (2) are satisfied for the stochastic process (5a)-(7).

**Numerical Procedure:**

The Euler approximation of the system of stochastic differential equations (5a)-(7) is presented on the time grid, \( 0 < t_1 < t_2 < \cdots < t_N \), such that the Wiener process \( dW(t_n) \) is replaced by \( \varepsilon_i^n \sqrt{\Delta t} \), where \( \varepsilon_i^n \) is a random element of the normal distribution with mean 0, variance 1 and \( \Delta t = t_{n+1} - t_n \), for \( m = 1, 2, \ldots, N-1 \).

For the states \( i = 1, 2, \ldots, m-1 \), letting \( P_i^n = P_i(t_n) \), the discrete analogue of (5) is given by:

\[ P_i^{n+1} = P_i^n \alpha_i(P_i^n - P_i^n) \Delta t + \sigma_i \sqrt{P_i^n} \sigma_i \sqrt{P_i^n + P_i^n + \cdots + P_i^n} \varepsilon_i^n \sqrt{\Delta t} \]

for \( n = 1, 2, \ldots, N-1 \), such that

\[ P_0^n = P_i \]

where

\[ \beta_j^n(P_1^n, P_2^n, \ldots, P_{m-1}^n) = \begin{cases} 1 & ; j < m - 1 \\ \sqrt{1 - (P_1^n + P_2^n + \cdots + P_{m-1}^n)} & ; j = m - 1 \end{cases} \]

and

\[ P_m^n = 1 - (P_1^n + P_2^n + \cdots + P_{m-1}^n) \]

(cf. ref. [5]).

**Numerical Experiments and Results:**

Numerical experiments were made to examine the effects of the various parameters appearing in equation (5). For tractability, we considered here four transition states \( (m = 4) \) and a time horizon \( T = 1 \). The two sets of model data of concern for the transitional probabilities \( P_i \) included the rates of reversion to the mean \( \alpha_i \) and the dispersions \( \sigma_i \), for the transition states \( i = 1, 2, 3 \). In the experiments presented, we hold the dispersion at a constant level and vary the rates of reversion to the mean between the transition states. Specifically, we assigned \( \alpha_1 = 20 \), \( \alpha_2 = 10 \), \( \alpha_3 = 50 \) and \( \sigma_1 = \sigma_2 = \sigma_3 = 0.05 \). For the mean reverting levels, we chose: \( P_1 = 0.5 \), \( P_2 = 0.3 \), and \( P_3 = 0.15 \); the processes started at the mean reverting levels.

For the numerical approximation of section 3, we took \( N = 100 (\Delta t = 0.01) \) computed by (8a)-(9). Our random sample \( \varepsilon_i^n \) in (8a) was taken from a normal distribution with a mean of zero and a variance of one. A C++ code was developed in order to implement the Euler approximation using the <random> library. As an indication of the model’s output, we present in Figures 1 and 2 (figures shown after references) trial results in two complementary ways: (i) each transition probability considered individually over the course of three simulations and (ii) the entire set of transition probabilities collectively resulting from a single numerical experiment.

In Figure 1, we showed three realizations (\( \alpha_1, \alpha_2, \alpha_3 \) ) and the mean for each transitional probability \( (P_1, P_2, P_3, P_4) \). We leave the dispersions \( \sigma_i \) unchanged, however, the rate of reversion to the mean \( \alpha_i \) varied for each of the probabilities with \( P_2 \) having the weakest rate and \( P_3 \) having the strongest. The effect of the rate of reversion to the mean is seen by noting the relative chopiness in the sample path of Figure 1c and smoothness of Figure 1b as benchmarked against Figures 1a and 1d.
In Figure 2, we plotted the first and second realizations for each transition probability. In particular, we note that at any instant of time, the four probabilities satisfy the prior conditions (1) and (2) such that each probability remains bounded between 0 and 1 and the sum of the transitional probabilities is 1. In both figures we see the randomness inherent to the model resulting from the selection of $e_i^n$ in (8a).

Discussion and Conclusion:
A transitional probability is the probability of transitioning from one state to another at a particular instant of time. We have developed a mathematical model that allows each transitional probability of a system to evolve over time, while still reverting to a predetermined mean value at a given rate. We have also presented approximation procedures of the stochastic system based on the Monte-Carlo method (i.e. Euler approximation) and were able to visualize the relative effects of the various model parameters. In particular, the system of section 2 was employed in [2] to represent transitions between credit states in order to model default risk in financial contracts.

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References:


for $P_1$ b) Expectation and sample paths for $P_2$ c) Expectation and sample paths for $P_3$ d) Expectation and sample paths for $P_4$

Figure 1. Sample paths per transitional probabilities. The figures are as follows: a) Expectation and sample paths

Figure 2. Sample paths per simulation. Figures are as follows: a) Realization $\omega_1$ b) Realization $\omega_2$
Communications
A Study of All-Girl High School Media Activities Towards Males
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Abstract: This study analyzes, from a historical context, the use of texting and other social media messenger tools of females who attended all-girl high schools by exploring their lived experiences and social interactions with males. The focus is on how the females used media technology tools, like texting and other social messenger tools, while attending their all-girl high schools. The purpose of this case study is to determine how these females used texting (and social media messenger tools) to build and nurture relationships with males. This study is meant to be solely about how females attending these type of schools used media technologies to create and maintain relationships with males; not as a comparison between female’s media technology behaviors between public and private schools. The findings for this research manifest themselves into three main categories which include recognition of unwritten rules among females, that females are more apt to break the unwritten rules when communicating with males, and texting serves as tool for nurturing relationships with significant others. The significance of this study is that it provides an example of a specific body of people that are more dependent upon social media sites (because of the all-girl school environment) to begin creating relationships with males, which could be generalized to larger groups who share similar challenges.

Introduction:

The world is becoming increasingly more tech savvy every day and it is important to identify the link that media technology has with females attending all-girl high schools. Clearly identifying females’ usage of media technologies, and how these connect them to males will benefit faculty members, and even parents, as they can adjust some of their actions to accommodate this platform usage.

This case study explores, from a historical perspective, college freshmen who attended an all-girl high school and their use of media activities, like texting and other social media messenger tools. High school girls are more apt to texting and typically send around 100 messages a day (Lenhart, 2012), however, what is not known is how texting impacts their ability to forge and maintain key relationships with males.

The focus of this research is to develop a more comprehensive understanding of how girls attending an all-girl high school use texting and other social messenger tools in accomplishing their social activities. The questions this study looked to answer include:

1. How did girls at an all-girl high school use texting and other social messenger tools?
2. How did teenage girls describe the role of texting and other social messenger tools in creating relationships with males?
3. How did teenage girls describe their use of texting to nurture relationships with the opposite sex?

Literature Review:

Single Sex Schools

There has been a continuous debate on the advantages and disadvantages of teenagers attending single sex schools. The prominent fears of parents are the regression of gender equality and a decrease in self confidence that becomes magnified when the opposite sex is involved (Chadwell, 2010). However, discussions with these students attending a single sex school usually results in responses of confidence and self-esteem skyrocketing. Researchers have found, “girls developed less gender stereotyped interests and self-concepts and were more likely to aspire to adopt a career as a scientist compared to girls attending co-educative schools” (Titze, Jansen, & Heil, 2011, p. 705). By breaking down these gender barriers, single sex schools lead to improved gender equality. Another study done found, “single-sex schooling...support girls’ innately different learning style[s] may be interested in outcomes concerning academic motivation and achievement” (Pahlke, Bigler, & Patterson, 2014, p. 262). Catering to the females’ unique learning styles and promoting a positive impact on females’ futures are two examples of the tools single sex schools give their female students to develop into independent young women. These studies give a glimpse into how educating exclusively females is inherently different, and this study focuses on whether these differences continue to manifest themselves through other avenues of their lives.
Social Media

About 95% of American teenagers have an online presence and 80% of those have profile(s) on various social media sites (Lenhart et al., 2011). It was found that 69% of American teenagers use Instagram, 63% percent use Twitter, 72% use Facebook, and 30% use other types of social media, like MySpace (Blaszczak-Boxe, 2014). Researchers have found that social media sites somewhat pressure females to create a 'best self,' which is one that meets “norms for sociability, interests, and attractiveness” (Burkell, Fortier, Wong, & Simpson, 2014, p. 980). It seems that a female’s ‘best self,’ within America, is overly sexual and unafraid of showing off her body.

Bailey, Steeves, Burkell, and Regan (2013) observed over 1,500 teenage females’ social media profiles to see if a specific type of online female existed. The researchers were searching for the existence of a type of online female that embodied, this American ideology of a female’s ‘best self.’ They found that females relied on overtly sexual portals of themselves with friends and partners to create their online image (Bailey, Steeves, Burkell, & Regan, 2013). Instead of social media being a place where girls could defy these standards, American culture has seeped into social media and magnified this type of behavior (Bailey, Steeves, Burkell, & Regan, 2013).

Texting/Sexting

There has been an increase of teenagers having cell phones, from 56% in 2004 to 85% in 2009 (Frank, Santurri, & Knight, 2010). Teenagers send an average of 2,022 texts per month (Cocotas, 2013). With greater rates of cellphone ownership coupled with large quantities of texting, incidents of sexting are bound to increase. Temple et al., (2012) found that approximately 68% of teenage females were asked by males to send them a sext; about 28% of these females admitted to sending a naked picture of themselves. These actions were motivated by responses that mirrored a dependency sexting, because females believed the males would quickly move on and not speak to them anymore (Lenhart, 2009). This suggests that texting and sexting are becoming a ‘package deal’ and are more prevalent in females’ lives than ever.

Materials and Methods:

Instruments

This study was conducted through a qualitative framework using in-depth interviews and a focus group. Before research commenced, University of Nevada, Reno Internal Review Board approval was obtained to study human subjects. After approval, recruitment began by hanging up flyers throughout the University of Nevada, Reno’s (UNR) campus. These flyers advertised the study to females, which included the type of participants needed.

Participants

The participants recruited were females between the ages of 18 and 25. The reason for the age requirement is that the participants would be closer to their high school experiences, thus having a better recollection of them as well as being closer to a more technological age. The sexual orientation required of participants was implied as heterosexual because this study was focused on male/female interactions.

After the first few participants made contact, the researcher used snow ball sampling to contact the rest of the participants, in which the initial participants recruited additional participants. The participants were students from UNR, Oregon State University, and a young woman that had recently graduated. The participants were then given a choice between an individual interview and a focus group. Six females chose in-depth interviews, while three chose the focus group.

Procedure

Before the interviews began there was a pre-screening to ensure the participants met the requirements needed, such as having attended an all-girl high school, using some sort of media technology while attending high school, etc. After it was established the criteria were met, the interviews began. Each individual interview was about 15-25 minutes and encompassed a standard series of questions, as well as specific questions to get a better view into each participant’s life. Each interview was also audio-recorded on the researcher’s cell phone.

The focus group was about 30-40 minutes and asked a standard series of questions. The group questions were different from the individual interviews, because they were more broadly focused. The group was both audio-recorded and videotaped.

Design

Once the transcriptions were completed, the researcher used Saldaña’s (2013) method, which focuses on the creation of codes, categories, and themes, derived from the research. The researcher then drew a type of map that matched codes to categories and then attached them to overarching themes. The three themes that emerged were:

1. Recognition of unwritten rules among females
2. More apt to break rules when communicating with males
3. Texting serves as tool for nurturing relationships

Each of the major themes were supplemented with sub-findings, which are illustrated in figure 1.
Discussion of findings:
(1) Recognition of unwritten rules among females

Social Media Usage
The current study found that all the participants used social media in their everyday activities. They used social media sites as outlets for observing. As Megan says, “I just feel like it’s an update on life, like seeing what people are doing.” Eliza seconds this type of idea by saying, “I go on Facebook to check what other people are up to, but that doesn’t necessarily mean I interact with them.” According to these two participants, social media sites are used to talk about themselves and to catch up on life events without having to actually talk to each other in person. Therefore, social media sites were not used to have in-depth conversation with people, including males; instead, they were used as an ‘opening tool,’ where some general conversation could result.

Social Media Responsibility
All nine participants agreed that they used social media responsibly. The disagreement between the participants arose in two facets. The first group was strict on their privacy settings. Anything posted by these women that they deemed inappropriate would only be seen by their pre-approved select group of ‘friends’ or ‘followers.’ Even though participants anticipated people to open up about their lives on social media platforms, these participants also expect a certain degree of privacy. As Christina put it:

If my cousins are trying to get ahold of me I will tell them I am [at] this location, you know via tweet. So it’s not necessarily a good thing, but at the same time as long as you have your settings on private, and so that they are the only ones that can see it, then I believe it is okay.

As long as the message is either completely private to the party in question or only available to her friends to view, the message/post is safe. Megan agrees with this idea by saying:

I have heard stories about how people can get in contact with you super easily, and that scares me. So I put everything on private, my Facebook, Instagram, everything on private. So people will have to go directly through me and talk to me.

(2) More apt to break rules when communicating with males

Keeping an Online Image
Participants in this study believe that females turn to more sexual depictions of themselves when males are involved. The participants unanimously felt that females were too sexual online. Eve concurs with this idea by saying:

They will post these pictures and they will look really ‘slutty,’ they look like prostitutes or hookers or something like that. I just don’t understand. Then they will get all of these comments and then you see them later on, and they try and act like they are high and mighty.

Eve’s comment shows that she believes it is fairly common for females, in general, to portray themselves sexually online. Interestingly, Eve’s comment also shows that even though it is fairly common for females to be portraying themselves sexually, other females are still judgmental towards them.

Snapchat Movement
Snapchat allows some degree of privacy by having messages and photos self-destruct after they are seen. This evolution of technology provided another outlet for females to maintain their sexual image without the immediate ‘backlash’ for their behavior. As Casey remarks, “It was a movement where everyone was feeling like whatever they sent would just be deleted and gone.
forever. So they were more inclined to send things.” When Lisa was asked if she thought the rise of Snapchat increased people’s willingness to send partially or fully nude photos, Lisa instantly agreed and said: “Yes, definitely. It’s like oh well, I only sent it for 5 seconds, so he doesn’t have it. They really thought the pressure is off, I can send this photo, and it will only be up for however many seconds I want. It is a free little sneak peek.

Snapchat allowed females to believe this type of behavior was essentially risk free, which aided in their confidence that this was an easy and reliable way to retain a male’s attention.

Society’s Impact
The participants also placed a heavy amount of blame on society for this sexualized behavior. They believe society created the idea of beauty that emphasized highly sexual female body imagery, which the participants believe caters to the male’s desire of beauty. Lisa agrees:

They are constantly seeing on social media that guys like a certain body type and they feel pressured to send a photo, like oh if you like that then you might like me, and then send a nude or something.

The participants explain that females try and mold themselves into what males seem to like, hoping to get noticed. As Eve says, “They want to change and fit in.” Eliza adds:

Society has a grand notion of what women are good for in a way and that comes down to how they sexualize women in media. Unless there is another system or support that comes in and tells them no, it doesn’t have to be this way, they will kind of rely on that idea of what they are ‘supposed’ to be.

The male’s definition of what is ‘beautiful’ or ‘sexy’ is drilled into a female’s thought process starting at a very young age. It is implicit in Eliza’s commentary that it is hard to break out of that type of thought process when it has been a habit forming for years. Such socialization, as Eliza mentions, requires an outside support system to convey to females that the information is false.

(3) Texting serves as tool for nurturing relationships
Texting
The Participants were also unanimous in their agreement that texting is essential to making a relationship last. Since they attended all-girl schools and were busy in a variety of activities, and likely did not have daily one-on-one interactions, talking to their significant other relied on texting. It became the next best way to communicate with males. Texting was used around the clock during any period that the participants had a free moment, such as on the bus to school or while waiting for an activity to start. As Lisa says, when reflecting on a past relationship:

My life was so busy...and then I did swim team. So I would stay at school for like 3 hours, go to swim practice, and then come home around 9pm.

Since Lisa could not see her boyfriend often, because she was busy with school and her other activities, she relied on texting to both create and maintain the relationship.

Sexting
Along with talking and getting to know someone’s personality, females searched for intimacy. It can be concluded that, since most romantic relationships eventually include an intimate factor, the females typically found themselves having to compensate through the use of sexting. The sexting was used to bring an intimacy aspect into these romantic relationships quickly. Lisa discusses why sexting is a bit more prevalent to maintain the opposite sex’s interest by saying, “it’s just easier and it’s something they can see without being in contact with them all the time, because personality-wise it’s hard to get to know people that don’t go to school with you. Samantha pipes in and says, “There was more pressure to appear more attractive because we looked so ugly at school.” Since females attending single sex schools do not see males on a daily basis, it meant they could worry less about their appearance. It could also be concluded, that sending sexual pictures became the primary means of both validating and securing a romantic relationship.

Conclusions:
Research Question One: How did girls at an all-girl high school use texting and other social messenger tools?

The participants admitted to using various social media platforms. They did not use these social media sites for in-depth interaction with people, but for observing and light conversation. The participants would check out the sites and get updated on their friend’s lives through their posts. Social media was more about promoting one’s ‘best self,’ through various posts. This effort of being the most ‘likeable’ online lead to people being more observant and only involved in ‘light’ conversations with one another on these platforms. By people emulating this idea online, it was understandable why females felt that any meaningful, in-depth conversations would happen through a different medium like texting.

Another conclusion is that privacy is important when using social media. Privacy precautions manifested
itself into two main groups. The first group was strict on their privacy settings by choosing their ‘friends’ or ‘followers’. Anything this group posted deemed inappropriate would only be seen by their approved select group of ‘friends’ or ‘followers’. The second group avoided posting anything inappropriate online because of the fear of future repercussions, even though its viewers were restricted. Ultimately, it was used as a tool to remain open about their lives, which was culturally expected, while retaining a degree of privacy.

Research Question Two: How did teenage girls describe the role of texting and other social messenger tools in creating relationships with the opposite sex?

The participants had a consensus of how female users should act around the opposite sex on social media sites. According to the participants, the females promoted a more sexual image of themselves online in an effort to catch the attention of the opposite sex. Even though these females sent photos that broke the etiquette, they did so knowing other females would be judgmental about the sexual behavior. This opinion was ironic because all of the participants were participating in the same sexual behavior.

In the midst of all these ill feelings the females had with one another, Snapchat made its appearance and ignited a movement. This movement provided another outlet for females to keep up their sexual image without the immediate ‘backlash’ for their behavior. They believed they could send more suggestive pictures to males, because it would delete after so many seconds and no other females could negatively judge it. The female participants understood this as being essentially risk free. A conclusion that can be made is that females are willing to break the rules if they can send things that are not traceable by other females.

A final conclusion that can be made is that the reason females are judgmental against one another is because of the demands placed on them by society. The participants blamed society for promoting an idea of beauty that emphasizes females taking on a certain body image that caters to the male’s desires.

Research Question Three: How did teenage girls describe their use of texting to nurture relationships with the opposite sex?

The participants acknowledge that texting was a necessity to maintain a relationship. According to the participants, texting was especially used with females who were busy at school with academics and extra-curricular activities. A conclusion that can be made is that since most romantic relationships eventually include an intimate factor, the females typically found themselves having to compensate through the use of sexting.

Recommendations:
For Individuals Who Work with Females at the High School Level

1. Increase the number of participants with neighboring all male schools. By having more chances to see the males, females may begin to use texting more like social media.

2. Hold more training rallies and discussions on social media and texting responsibility to persuade the females against solely relying on their physical bodies to get the opposite sex’s attention.

For Future Study

1. Increase the number of participants with greater diversity among geographical locations to heighten generalizations across the population of females at high schools with their behaviors on texting and other social messenger applications. More states could lead to either solidifying certain ideas proposed in this study or introducing new concepts.

2. Create a series of interviews with the participants so that they gain more trust with the researcher, thus more information can be gathered. The participants would feel more comfortable sharing more information about themselves because a better rapport would be developed.

3. Add a written portion for the participants to fill out, through email, and make it anonymous. This way the participants can fill it out at their convenience and retain privacy, giving them more time to think through the questions.

4. To conduct a similar study with females currently attending all girl high schools. It would be interesting to see if the results differed much from this study’s participants.

Acknowledgements:
To my parents, Jay and Stacey, and my brothers, Alex and Jordon. I would like to thank Matthew Jejna for generously donating his time to help during the editing process. Todd Felts, your guidance was priceless. I could not think of a better way to say it; so, in your words, thanks for taking a risk on me.

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History
Comparing the Origins and Developments of Indian and Israeli Nationalist Movements

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Abstract: The writer seeks to frame the discussion of India’s and Israel’s shared historical trajectories with scholarship that analyzes the comparison of the origins and developments of Indian and Israeli nationalist movements. Scholarship in this field centers on four main areas of focus: the role of independence movements, the issues involved in land consolidation, the development of governance structures, and the post-independence relationship between India and Israel. Most of the contributions to the literature in this field had been undertaken by scholars in Pakistan, India, or Israel, with few Western scholars taking any interest in the evolution of this changing relationship. Furthermore, the existing discussion has centered on narrow topics, such as the relationship between India and Israel in the realm of wider global issues; for example, the two countries’ nuclear programs, military relationships, and responses to terrorist threats. In this paper, the author analyzes the similar historical trajectories of India and Israel in the context of the aforementioned four areas of focus and also outlines potential avenues for future research in this field.

Introduction:

“Our cosmopolitan founding fathers – [Jawaharlal] Nehru and [Mohandas] Gandhi, [David] Ben-Gurion and [Chaim] Weizmann – and egalitarian ideals helped give the new nation-states, created within months of each other, their glow of heroic virtue. It mattered little during their early years that both countries were born of...nationalist opportunism, of clumsy partition, war and ethnic cleansing.”

-Indian essayist Pankaj Mishra

Given the similarities in their respective independence movements, this scholarship offers fertile territory for the field of comparative history. Scholarship on the origins and developments of Indian and Israeli nationalist movements combines around four main themes: the role of political leaders in furthering independence movements, the issues involved in land consolidation, the development of structures of political representation in government, and the post-independence relationship between India and Israel. Given that both countries’ nationalist movements stemmed from relationships with British colonialism, the growing economic and defense ties between the two countries—estimated at over $4.4 billion in 2013—as well as the placement and growth of democratic structures in both countries, one might be apt to trace the foundations of the India-Israel dynamic to a shared historical trajectory. Yet despite some common threads—opposition to British colonialism, independence through partition, and political leadership at statehood—a plethora of differences between the two case studies exist. A comparative examination of these distinctions becomes necessary in order to understand both the similar and different historical trajectories of the India-Israel relationship.

An appropriate discussion of the field of comparative history comes from American historian Raymond Grew, who notes:

Comparison is most enlightening when...attention is paid to the intricate relationships between the elements compared and the particular societies in which they are located...The search is for patterns of behavior and circumscribed hypotheses, and it is as likely to result in the recognition of unexpected connections between aspects of society previously thought to be unrelated as in general theory.

The goal of this scholarship will follow Grew’s methodology, comparing the origins of nationalism in


India and Israel, how these origins influence the relationships between India and Israel, and, drawing from Grew, illuminating any “unexpected connections” that scholars may have overlooked or otherwise assumed were “unrelated” in the dynamic.

A survey of the existing literature on the India-Israel relationship mostly chronicles the post-1992 period, which was followed normalization of diplomatic ties between the two countries. Agricultural and energy trade networks have significant influence on the linkages between India and Israel (given the respective importance of both for each country), yet the existing scholarship often yields limited or no discussion on these crucial post-independence relationships. Moreover, scholars have had limited discussions about comparing both countries’ parliamentary systems, particularly in terms of the coalition-building efforts necessary for minority groups to articulate their voices in the political process. A comparative study discussing how the origins and development of Indian and Israeli nationalist movements have had an influence on successful independence movements, land consolidation struggles, political representation in governance structures, and post-independence economic and military relationships would fill the gaps in existing literature and contribute to a broader explanation of the evolving dynamics between India and Israel.

Comparing Nationalist Movements:

Historians and political scientists have observed many similarities between Indian and Israeli nationalist movements—a shared opposition to British colonialism, the use of partition as a means of for achieving independence, and the development of political leadership at the beginnings of statehood. With regard to nationalist movements, Arthur G. Rubinoff, a University of Toronto political scientist, observes that Jewish nationalism in Palestine and Muslim nationalism on the Subcontinent both pursued independence [from British colonialism] through partition as the only means that a minority could secure its national identity. 3 These partition movements stirred prolonged confrontations with neighbors that still affect both countries to this day: persisting border claims on India’s northwest frontier still influence India’s geopolitical relations with its neighbors. In addition, Israel has sought territorial claims in the Sinai Peninsula and Gaza Strip with Egypt, the Golan Heights on its border with Syria, and the West Bank with Jordan for population and security purposes. 4 Aside from these unresolved conflicts over territory, another similarity between the Indian and Israeli independence movements lies in what Swedish political scientists Ulrika Möller and Isabell Schierenbeck termed “political leadership at nascent statehood.” Referencing the India-Israel comparison, they noted that “[t]he key political leader in all cases – Jawaharlal Nehru, Mohammed Ali Jinnah, David Ben-Gurion and Yasir Arafat – both mobilized and orchestrated the national struggle for independence and was the decisive political decision-maker at nascent statehood” in symbolic (heritage/destiny) strategic (bargain/restrain), and relational (informal/formal) terms. 5 Moreover, the “continuity of their political leadership over time” allows examination of both countries for the purpose of understanding the pivotal roles these leaders played in their respective independence movements. 6

Aside from these similarities, the Indian and Israeli independence movements differ in the levels of violence involved in achieving statehood, minority rights in the newly created state, and the overall self-conception of statehood. Though the Indian case had prominent non-violent characteristics—perhaps best exemplified through Gandhi’s support of civil disobedience as a mechanism for achieving independence—Israeli political scientist Ayelet Harel-Shalev notes the violent partition process and violent competition, particularly between Hindus and Muslims. 7 In the Israeli independence case, various paramilitary organizations, including the Haganah and Irgun, were formed for the purpose of Israeli independence efforts. Regarding minority rights in both newly created states, Harel-Shalev distinguishes the Indian case from the Israeli by asserting, “India’s Muslim minority has more rights than the Arab-Palestinian minority in Israel.” 8 Within political society, Harel-Shalev further illustrates the differences among the Indian and Israeli cases by noting that “in Israel, the Arab minority was in fact perceived as a fifth column, and it has been identified as a national minority. In contrast, the Muslim minority in India pushes for religious and cultural autonomy and the enactment of affirmative action based on religion, without demanding recognition as a nationality minority.” 9 Additionally, the distinct

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4Ibid.
6Ibid.
8Ibid, 105.
9Ibid.
independence movements in each country led to differing conceptions of statehood. The essential difference includes the fact that India is a secular democratic state whereas Israel is an ethnic democracy with what Harel-Shalev refers to as “differentiated citizenship discourses” because Israel is “first… the state of the Jewish people.”

This difference has led to Israel enabling minorities to integrate into society as individuals of their own collective identities (Bedouins, Christians, et cetera), with a special recognition of the Arab minority as an ethnic and linguistic minority with limited collective rights, including independent schooling and having Arabic as a national language. However, the Arab minority in Israel—unlike the Muslim minority in India, a state which does not explicitly define itself as a religious state—is not a part of the definition of the Israeli state, and is seeing the reemergence of attempts to exclude it further from an Israeli identity that is being defined as both Jewish, and Zionist.

**Land Consolidation Efforts:**

One of the more difficult issues involved in a comparative history of the Indian and Israeli nationalist movements—simply due to the dearth of literature comparing the two case studies on this issue—continues to be land consolidation efforts. Both countries have similar characteristics in this regard, in that intercommunal strife during both countries’ respective independence periods catalyzed the flight of refugees, leading to persisting land disputes on frontier or periphery regions. Although the land consolidation issue involved the movement of refugees, in the Indian case study, the land consolidation focused on establishing separate states, with a Pakistani state created for Muslims and an Indian state created with a Hindu majority. In the Israeli case study, massive population exchanges occurred, but Arab refugees in the case of Israel did not have a ‘state’ from which to emigrate, creating a long-term regional refugee situation. In both countries, one similarity includes continuing land disputes on the peripheries of both India and Israel. In Israel, land conflicts within the Sinai Peninsula have been mostly resolved and Israel has unilaterally withdrawn from the Gaza Strip, but settlements continue to expand within the West Bank and the Golan Heights, a result of growing demographics partially caused by both the Law of Return, which allows Jews from around the world to immigrate to Israel, as well as natural population growth. With regard to India, a 2012 article in The Economist argued that “disputed borders are both a cause and a symptom of tensions between big [neighbors] in South Asia,” as pressures “between India and China flare on occasion, especially along India’s far northeastern and northwestern borders.” Further complicating the situation in India, the article notes that when the British colonialists “withdrew from India, [they] left a dangerous legacy of carelessly or arbitrarily drawn borders,” further complicated by the mountainous topographies around India’s borders. Ultimately, both cases feature failures to agree and demarcate precise borders, ensuring that future disagreements would continue to flare up.

**Development of Governance Structures:**

The development of governance structures proves to be one of the areas where both countries’ independence movements have influenced their similar historical trajectories. While both countries have similarities—including the persistence of democratic institutions—such common threads cannot be analyzed without examining the status of minorities because these countries are democratic states with egalitarian ideals. Although both countries utilize a parliamentary system of government, they also possess governance structures that reflect their states’ attempts to accommodate large minority groups in the political process. India’s federalism and a secular democracy provides a sharp contrast to the Israeli unitary structure which is defined as having both “Jewish and democratic” orientations. Both countries provide collective rights for minorities, but the comparison can become difficult when analyzing the spectrum of rights for minorities in both countries. In one respect, the wide spectrum of sectarian groups within both countries’ populations, along with the shared legacy of the British parliamentary system of government have influenced the numerous political parties that have emerged in both countries. The result is a necessity of parliamentary coalition-building in order to govern, among other reasons. In Israel, candidates affiliated with political parties vying for seats in the parliament, known as the Knesset, must meet the electoral threshold of 3.25% of the vote, with no single party in Israeli history ever achieving and sustaining an outright governable majority. In contrast, India’s parliamentary structure possesses no electoral threshold, which, along with India’s large population and natural diversity, have contributed to the growth of a party structure that allowed parties—such as the Congress Party—to reach across sectarian divides and maintain a viable coalition in Indian politics for several decades.

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10 Ibid, 104.
11 Ibid, 106.
12 Ibid.
13 Ibid.
14 Ibid.
Post-Independence Economic and Military Relationships:

The post-independence relationship between India and Israel has evolved from a tricky balance of India hedging its own national interests in recognizing Israel, but not establishing formal ties to what Pakistani international relations scholar Mahwish Hafeez calls a “common national psyche,” which makes India and Israel “natural allies.” This “common national psyche” stemmed from economic relationships through agriculture, as well as military relationships through increased defense trade. India initially opposed United Nations membership for Israel in 1949, but in September 1950, after Israel had been in existence for two years and been participating in the United Nations, the Indian government accorded recognition but deferred the process of normalizing relations so as not to offend domestic its own Muslim population and neighboring Muslim-majority states. Political scientist Arthur G. Rubinoff numbered India’s Muslims at over 11% of the country’s population, making Indian politicians—especially those on dominant Congress Party tickets—considerate of Muslim attitudes towards Israel in the formulation of Indian foreign policy issues during the first few decades of the post-independence period. After Israel, Britain, and France invaded Egypt during the Suez Crisis of 1956, India interpreted this move as the reimposition of European colonialism in the Afro-Asian World, and shifted its attitude towards Israel from “neglect” of Israel in the international arena to “antagonism” for Israel’s military actions. After Nehru’s death in 1964, his successors compensated for India’s relationship with Israel by allowing bilateral relations to deteriorate, leading to reduced diplomatic ties between the two nations. However, India’s wars with Pakistan added a twist to the India-Israel relationship, as Israel secretly supplied India with arms, provided intelligence, and delivered military support to India during its 1965 and 1972 wars with Pakistan. This paved the way for enhanced relations and in 1977, Israeli Foreign Minister Moshe Dayan went to India for covert talks to establish formal diplomatic relations. After

Indira Gandhi perceived Israel as a “relentlessly expansionist” government and downgraded the Israeli mission in Bombay. After her son Rajiv succeeded to the prime ministership following her assassination, Indian hostility towards Israel increased, but his defeat in the 1989 elections led to the accession of P.V. Narasimha Rao’s Congress government to restart the process of normalization after the collapse of the Soviet Union.

Arab governments, many of whom had friendly relations with India—especially considering India’s need for swift passage of its relatively large amount of trade through the Suez Canal—were no longer able to exert significant influence on India’s relations with Israel due to the depressed price of crude oil during the 1980s. In the words of international relations scholars Rajan Menon and Swati Pandey, this event signaled the end of India’s “tortured formulation” of a relationship with Israel. In terms of the aforementioned “common national psyche,” Hafeez notes that both countries had been extending their respective roles in Muslim lands, both saw themselves as democracies surrounding by hostile and implacable adversaries, and both had shared histories of having struggled under British imperialism. Moreover, both countries have seen their relationship grow in recent decades as a mechanism of countering Pakistani influence, particularly Pakistan’s growing nuclear program, with then-Israeli Defense Minister Ariel Sharon proposing in 1983 that both Israel and India “act jointly to destroy” Pakistan’s “budding nuclear capability” and Indian scientists visiting Israel one year later “to discuss their apprehensions over the Pakistani nuclear program.”

Existing literature details the growing billion-dollar trade relations between India and Israel as one example of the positive relationship between the two countries, but some elements of those trade relations can serve as examples of American historian Raymond Grew’s “unexpected connections” of comparative history, including agriculture. In terms of the agricultural links between the two countries, few scholars discuss any relationship between India and Israel regarding the

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19Ibid.


21Ibid.
former’s Green Revolution in the 1960s, a turning point for India’s agriculture. Despite this fact, one modern
development in the relationship is the creation of a“second” Green Revolution (transitioning from producing
sustainable agriculture in the “first” Green Revolution to diversifying the food basket in the “second” Green Revolution) as an example of a flourishing post-independence link. A recent Jerusalem Post editorial
detailed the growing Israel-India cooperation in agriculture and water technology through both
government-sponsored initiatives and private business deals. This is significant as a shared interest because of
the similarities in geography and agriculture between Israel and India. In 2014, Israeli and Indian government
institutions jointly launched an online network that provides real-time communications between Indian
farmers and Israeli agricultural technology experts, and Israel is in the process of setting up 28 agricultural
training centers throughout India. Israeli universities have teamed with ten Indian “agricultural centers of
excellence” to increase crop yields by enhancing crop “micro-irrigation” techniques. Given India’s growing
need to feed over a billion people, one of the growing areas of cooperation in the India-Israel relationship will
certainly be agriculture.

The evolution of coalition-building in the Indian and Israeli parliamentary systems – often termed national
unity governments – remains an under-discussed topic in scholarship despite its centrality to both countries’
modern political systems. Given the diversity of the minority groups in both countries, one might better
understand the presence of over a dozen parties with seats (and eight additional parties vying for seats in upcoming
elections) in the 120-member Israeli Knesset, with each party essentially acting as a voice in government for
various sectarian groups. Of particular importance is how the parallel history of both countries influenced the
development and necessity of “national unity” governments as a mechanism of dealing with diverse
factions and minority groups. In India’s federalist structure, there are 6 national parties, 36 state parties, and
219 regional parties with some representation in either house of the Indian Parliament. Broadly speaking, this
diversity in political representation in national legislatures has given both countries a variety of challenges in dealing


with minority group representation, with “major” parties
having to accommodate sometimes the smallest of
minority parties in order to achieve a governable
majority—particularly in the Israeli case study. However,
despite this range of political parties in both India and
Israel, the Congress Party in India has prevailed as
reaching across sectarian divides throughout several
decades of India’s post-independence era. Few parallels
exist in the comparatively smaller Israeli political milieu,
although scholars would certainly be apt to explore this
issue more fully in separate scholarship.

Conclusion:

One growing trend in the literature is scholarship
on the responses to both India and Israel to external and
internal terrorist threats as well as defense and security
collaborations between the two countries. Given the
discussion of a “common national psyche” between Israel
and India, especially regarding the collective threats they
have faced in recent years, one could justify a
comparative historical study on this aspect alone. As
Pakistani scholar Sanam Noor notes, “the fact that both
India and Israel are facing insurgencies at home (Kashmir
and Palestine) offers common ground for their
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existing literature documents the decades-long military
relationship between India and Israel, one that preceded
the establishment of formal diplomatic ties in 1992. In
times of war, Israel has been extremely helpful to India by
lending logistical support to India during the latter's wars
with Pakistan in 1965 and 1972. There is also evidence of
Israel’s assistance to India during the 1999 Kargil war
between India and Pakistan, with the former Israeli
ambassador to India, Yehoyada Haim, admitting that
Israel had assisted India by providing remotely piloted
vehicles (RPVs), which proved to be helpful for the
Indians operating in the difficult terrain of Kargil. This
strategic defense relationship continued in the decades
following India’s conflicts in the 1990s, as Indian
international relations scholar P.R. Kumaraswamy
observed: “by [the] early 21st century Israel had become
India’s second largest arms supplier and India, the largest
export destination for Israeli arms.”

25Ibid, 97.

parties-in-india/.


28“Chapter 16: Contextualising Israel in India's Middle East Policy.” In India and West Asia in the Era of Globalisation, edited by Anwar

29The evolution of coalition-building in the Indian and Israeli parliamentary systems – often termed national unity governments – remains an under-discussed topic in scholarship despite its centrality to both countries’ modern political systems. Given the diversity of the minority groups in both countries, one might better understand the presence of over a dozen parties with seats (and eight additional parties vying for seats in upcoming elections) in the 120-member Israeli Knesset, with each party essentially acting as a voice in government for various sectarian groups. Of particular importance is how the parallel history of both countries influenced the development and necessity of “national unity” governments as a mechanism of dealing with diverse factions and minority groups. In India’s federalist structure, there are 6 national parties, 36 state parties, and 219 regional parties with some representation in either house of the Indian Parliament. Broadly speaking, this diversity in political representation in national legislatures has given both countries a variety of challenges in dealing


with minority group representation, with “major” parties having to accommodate sometimes the smallest of
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Conclusion:

One growing trend in the literature is scholarship on the responses to both India and Israel to external and internal terrorist threats as well as defense and security collaborations between the two countries. Given the discussion of a “common national psyche” between Israel and India, especially regarding the collective threats they have faced in recent years, one could justify a comparative historical study on this aspect alone. As Pakistani scholar Sanam Noor notes, “the fact that both India and Israel are facing insurgencies at home (Kashmir and Palestine) offers common ground for their cooperation in counter-insurgency tactics.” Moreover, existing literature documents the decades-long military relationship between India and Israel, one that preceded the establishment of formal diplomatic ties in 1992. In times of war, Israel has been extremely helpful to India by lending logistical support to India during the latter's wars with Pakistan in 1965 and 1972. There is also evidence of Israel’s assistance to India during the 1999 Kargil war between India and Pakistan, with the former Israeli ambassador to India, Yehoyada Haim, admitting that Israel had assisted India by providing remotely piloted vehicles (RPVs), which proved to be helpful for the Indians operating in the difficult terrain of Kargil. This strategic defense relationship continued in the decades following India’s conflicts in the 1990s, as Indian international relations scholar P.R. Kumaraswamy observed: “by [the] early 21st century Israel had become India’s second largest arms supplier and India, the largest export destination for Israeli arms.”


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not necessarily have common adversaries, but because of their similarities in fighting terrorism within their respective borders and peripheries, they cooperate in the defense trade. Areas like counterterrorism, border management, early warning systems, small arms, ammunition, missiles and missile systems began to dominate the Indo-Israeli security agenda, with military-security ties emerging as the most prominent and hence widely talked about dimension of the bilateral relations. Given that both countries also share significant concerns about Pakistan’s nuclear program and Pakistan’s role in combating terrorism, scholars would be justified in exploring the India-Israel dynamic in terms of responses to terrorist threats as well as defense and security collaborations.

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29Ibid.


Political Science
Teaching an Old Field New Tricks: Chinese Eugenics
Naomi E. Moran

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Abstract: This article evaluates the relationship between the Maternal and Infant Health Care Law of 1995 in China with continuing Chinese policies and scientific research based in eugenics. This article also explores the nature of western criticism and conception of eugenics in regards to Chinese eugenics-based science and medicine, with specific attention paid to the Maternal and Infant Health Care Law and recent Chinese feats in genetic engineering.

Eugenics: Introduction/Background:
In Europe and America, eugenics is associated with Nazi science and thus demonized; in China, it is a mainstay of the scientific establishment and political advancement. How do we understand these differences, and how do they relate to contemporary scientific and political climates? One of the most pervasive and influential social and scientific philosophies in modern China is something that originated in western society, quickly died out, and consequently became taboo in western culture because of its negative historical connotation. This philosophy is eugenics: the system under which Adolf Hitler was able to validate the holocaust of those he deemed subhuman. Eugenics, however, is a widely misunderstood concept; it is also the system that gave the modern world invaluable insight into the validity of genetic research, contraception, and birth screenings. This controversial topic continues to drive Chinese politics and social reforms, while western societies such as the United States look on with trepidation. Although complex, China’s relationship with eugenics continues to be a driving force in the country’s development and progress.

Eugenics officially began as a western construct that stemmed from the ideals of Social Darwinism, taking hold in the United States and other European societies; however, the idea of eugenics is neither new nor unique (Gillham 98). When Sir Francis Galton, the founder of eugenics, wrote Natural Inheritance in 1889, he was greatly influenced by Darwin’s earlier Origin of the Species (Gillham 92). Eugenics, at its core, means “good stock,” and advocates for selective breeding in order to better the human race (Gillham 98). While this concept may not seem particularly insidious or threatening at face value, it seems that eugenics really only is seen as problematic if it is explicitly employed by a state or system of authority, which we see evidence of in popular heated arguments about abortion laws where conservative religious groups call Planned Parenthood federally-supported organization that achieves “Eugenics by abortion” (Jackson), while liberal, pro-choice advocates ardentlly offer discordance (Gandy).

This controversy of state-sponsored eugenics is mainly westernized fear, due to its connotation with the Nazi party in Germany, which explicitly used eugenic philosophy and science in its holocaust programs. It is a reasonable cause for worry. As stated by the Encyclopedia of Contemporary American Social Issues, “In its day it was legitimate science, but today it haunts any discussion of controlling fertility or heredity” (1398); however, eugenics and politics are intricately linked, with Eugenics even becoming a political platform: “Eugenics was the popular science and associated political movement for state control of reproduction….” (Encyclopedia of Contemporary American Social Issues, 1398).

Since this is such a controversial topic, especially when dealing with any sort of reproductive laws in the West (such as the abortion debate mentioned above), we can use the experiences of Eurocentric societies in our consideration. Eurocentrism is a system in which European or Anglo-American societies define other societal experiences, demographics, and worldviews in terms of European or Anglo-American values. Often this system relies on a sense of western exceptionalism, which defines the European or Anglo-American traditions and cultural values as superior to the culture or society in question. We can use an evaluation of Eurocentrism and western exceptionalism to advance a discussion on the importance and influence that eugenics has had in China, as well as its effects worldwide and criticisms from western societies such as Europe, Canada, and the United States. For the sake of brevity, we will look specifically at the progression and effects of China’s current Maternal and Infant Health Care Law, passed in 1995, and China’s new advances in the fields of gene splicing and selective gene therapy. Throughout, we will evaluate these laws and programs in relationship to how the West portrays and interprets them, and whether these reactions are warranted or not.
The Chinese Maternal and Infant Health Care Law:

The Maternal and Infant Health Care Law of 1995 was enacted with the purpose of “ensuring the health of mothers and infants and improving the quality of the newborn population” (Maternal Infant H.C. Law Article 1). The law outlines the importance of China’s involvement in providing mothers and infants with sufficient health care (Article 2). There is a definite eugenics-inspired element to the law, which we will focus on: Articles 7-13 focus on “pre-marital health-care services” (Maternal Infant H.C. Law Article 7). Article 7 states that the State must provide services to pre-marital citizens, which includes sex education that focuses on reproduction and genetic disease; a health consultation with marriage and child development advice; and a medical examination for both partners (Maternal Infant H.C. Law Article 7, Items 1-3). This medical examination must be “conducted for both the male and female planning to be married to see whether they suffer from any disease that may have an adverse effect on marriage and child-bearing” (Maternal Infant H.C. Law Article 7, Item 3). The law continues to detail the nature of these examinations, which must include screenings for “genetic diseases of a serious nature; target infectious diseases; and relevant mental diseases” (Maternal Infant H.C. Law Article 8, items 1-3). In other words, couples must go through an examination process before they are married in order to be given a certificate of marriage by the state.

As we find in Therese Hesketh’s piece, this process is conducted by a doctor. She states, “Inquiry is made about hereditary illness and problems that might jeopardise parenting abilities, such as learning disorders and psychiatric problems” (Hesketh 277–279). Beyond psychological screenings, people are also given the standard physical screening: “The physical examination includes the obvious—height, weight, and blood pressure—and the rather less obvious—colour and distribution of hair” (Mao 139). The inclusion of the color and distribution of hair is exceptionally interesting, since this analysis of hair color and distribution was used in early Eugenic research in western societies such as the United States (Ayob and Messenger 412–413). Even more interesting is the special attention paid to sexual or hormonal conditions: “special (perhaps obsessive) emphasis is given to secondary sexual characteristics. In men these are feminisation of breasts, pubic hair…and so on. In women the pelvic examination is supposed to include palpation of the uterus and ovaries” (Hesketh 277). This suggests that these screenings are present to prevent more than just mental illness in babies, but also hormonal and physical defects that might otherwise hinder the child’s full quality of life or societally contrived normalcy; furthermore, this evidence suggests that while screening for the health of the next generation, these doctors are also screening people to determine if they are going to be effective and healthy parents (emotionally, mentally, and physically).

While these tests are potentially very useful in the context of childbirth and child-rearing, they serve the purpose of establishing the couple as “fit” or “unfit,” as defined by local or provincial criterion (Maternal Infant H.C. Law Article 13), for marriage; in other words, the couple must “pass” the premarital tests in order to become married—“fit” couples are rewarded with the certificate of health required for marriage (Hesketh 277). If the couple does not pass, they must seek therapy or health care in order to be married: “in other cases the marriage must be postponed to allow for some form of treatment or counselling,” (Hesketh 277). The law states that any member of the partnership who is still unable to pass the examination because of a serious condition, “which is considered to be inappropriate for child-bearing from a medical point of view” (Article 10), can only be married when they are no longer able to bear children, after “taking long-term contraceptive measures or performance of litigation operations” (Maternal Infant H.C. Law Article 10). In other words, couples with severe enough conditions or who are deemed “unfit” for child-bearing by a doctor are forced to agree to permanent contraception (Hesketh 277).

While this law may seem cumbersome and problematic to some westerners, it is not a new or foreign concept, as many people who want children consider their health and the possible subsequent health of their offspring. For instance, 94% of non-invasive prenatal testing clinics offer fetal screening to prospective parents in the United States; such clinics screen for birth defects and certain incurable, debilitating conditions such as Down’s syndrome (Allyse et. al.). It seems the only difference is that China’s screenings are mandated by the state. While the law does not explicitly require all marriages to be conducted this way, providing a provision for prospective parents to challenge the results of the examination (Maternal Infant H.C. Law Articles 11-12), this means little in a one-party system known for imprisoning or institutionalizing people who do not conform to what the party wants; furthermore, “the coercive implementation of birth control programmes so far indicates that eugenic legislation will be carried out with little regard for individual choice” (Dikotter 175). It should be noted that many other (even western) countries employ extensive mandatory premarital screenings in order to guard against infections such as “syphilis, rubella immunity, haemoglobinopathies, Tay-Sachs disease, hepatitis B, and, most recently, HIV” (Dikotter 175). These countries include Taiwan, Turkey, Egypt, Spain, Portugal, Italy, and Brazil, which employ some mandated pre-screenings (Hesketh 277). Here, we should also consider the many state-sponsored campaigns in the United States, Canada, and other western European
countries for voluntary testing and screening before choosing a sexual partner (Hesketh 277–279).

From a public health standpoint, this law is extremely useful. Its effects can “include diagnosis and treatment of unrecognised diseases” (Hesketh 278) such as psychological illness, sexually transmitted infections, and potential epidemics. It can also result in “reduced transmission of disease to partners and offspring” in order to widely prevent any hereditary illness that could be debilitating and devastating, such as Tay-Sachs disease (Hesketh 278). Additionally, this law provides “a forum for health education, and a convenient means of collecting information on the health of the population for epidemiological and planning purposes,” both of which provide invaluable population data as well as widespread education for the Chinese populace, therefore preventing further diseases from spreading (Hesketh 278).

It seems that components of this law are something that many westerners would support; after all, raised awareness and public education of disease through prenatal screening is certainly something that medical scientists and researchers in Europe, Canada, and the United States are striving for, as we can see in popular campaigns to encourage sexually active citizens to be tested for sexually-transmitted infections. Unfortunately, however, the fact that these Chinese screenings are state-mandated suddenly incites criticism. The goals of such screenings are founded on principles of eugenics, but the initiative is not called a eugenics-based program until it is mandated or backed by the state; therefore, we can safely say that eugenics is more than a philosophy or science, in fact, its existence as a science or philosophy seems to be completely dependent on its ties to politics and national health measures. In order to be widely considered as a system of eugenics-based science or philosophy, the set of policies must first be politically influenced.

**Chinese Eugenic Policies - Ethics, Methods, Goals, and Criticism:**

The Maternal and Infant Health Care Law had widespread support as of 1997 from Chinese geneticists (although we should consider that these statistics were compiled in the context of a highly controlling political climate) with many supporting the validity of eugenics-based research and legislation (Mao 139). An astounding 90% of Chinese scientists, however, were in favor of the introduction of a code of ethics in genetic practices and research, which indicates that while the law was not widely criticized, many called for standardized methodology to enforce or ensure that people were getting the care, as well as the premarital and prenatal screenings in a safe and ethical way, in order to provide prospective parents with effective choices and treatments while leaving them in control of their own progeny (Mao 139).

There has been even more outcry and call for reform from western societies such as the United States of America. It is a popularly-held belief that only “Totalitarian states are attracted to eugenics,” and that these programs must always, without fail, be harmful to the preservation of individual rights, which is arguably the most coveted, sacred concept to Americans and the American way of life (“Western Eyes on Chinese Eugenics Law”). There were even calls in the 1990s for American geneticists to publically boycott any scientific relationships with Chinese geneticists (Mao 139). While this exclusion did not completely happen, the threat of such a measure is enough to give grounds to evaluate the American response as a specifically sensitive reaction to any sort of mention of eugenics, likely based in ideals of western exceptionalism. While American scientists were hostile to this law twenty years ago (Mao 139), they have since seemed to become at least complacent in it, especially when it comes to Chinese genetic research and the progress facilitated by eugenics-based research, as there are little indications of a continuing call for cutting of scientific discourse between the United States and China.

The Chinese government seems to be more focused on using these aforementioned scientific and genetic advancements in the 2010s to eradicate disease, rather than introducing new eugenics-based laws for population control. While the Maternal and Infant Health Care Law is still in effect, such population controlling policies seem to be experiencing a relative decline. The One Child Policy was revoked in October of 2015, and in 2010, China ratified the United Nations Convention on the Rights of Persons with Disabilities in order to give more personal freedom and empowerment to those with disabilities (including the right to marry and bear children) (Petersen 85). Since these changes have happened so recently, it is still too early to tell how these new rights and legislative changes will be reconciled with the Maternal and Infant Health Care Law. Some may argue that these legal and political changes signal a decline in eugenics-based policies in China, but I would argue that the efforts of eugenic legislature and political philosophy are simply being redirected towards genetic research and other fields that could be advanced through a eugenics-based approach.

**Eugenics-Based Research – Advances, Effects and Discussion:**

The recent genetic research in China is astounding. It seems that Chinese scientists’ acceptance of eugenics has allowed them to focus less on ethical quandaries of the West and more on scientific progress in order to compete with western leaders in the field, such as the United States. China is increasingly becoming a leading global power in the field of genetic research and
modification. By embracing eugenic principles, Chinese politicians have created a climate in which scientists are free to explore the human genetic code and its possibilities without immediate fear of rebuke based on Eurocentric ideologies. These advances are both celebrated and criticized by westerners, but I would argue that this criticism is ill-placed and based out of Eurocentric ideals, not out of a supposed moral high ground. We see examples of this criticism when we evaluate different reactions to world-changing scientific advancements coming from the East, such as the first recorded report of “editing the genomes of human embryos” coming from China (Cyranoski and Reardon, 2015). Many western scientists cite this as an invaluable advancement in the field of biological research, stating that “gene editing in embryos could have a bright future because it could eradicate devastating genetic diseases before a baby is born” (Cyranoski and Reardon, 2015). The opportunity to enact such widespread benefit should be enough to seriously consider Chinese geneticists’ research as valuable. Furthermore, it could be beneficial for Western medicine to consider the wide-ranging positive effects of genetic modification not only in embryos, but in adults and living children if gene splicing is found to be capable of erasing diseases such as cancer, psychological illness, or hereditary disease such as sickle cell anemia.

Still, there are researchers criticizing these findings, citing ethics and western-based morality: “Researchers have also expressed concerns that any gene-editing research on human embryos could be a slippery slope towards unsafe or unethical uses of the technique” (Cyranoski and Reardon, 2015). It seems that whenever a new controversial topic comes along, Western moralists claim that it is somehow a slippery slope towards unethical behavior, as featured in the Department of Philosophy at Texas State University in defining a slippery slope argument (Texas State University). This “slippery slope” argument has been used by politicians, particularly in the United States, to advocate for the outlawing of interracial and homosexual marriage (Volokh 102), the disapproval of evolution taught as science (Nieminen and Mustonen 1), and the restricting of women’s access to reproductive health care (Thomson 1).

These types of fallacious arguments are widely considered to be based on beliefs of moral or religious superiority, rather than scientific facts; the “slippery slope” argument against genetic research on humans features the same rhetoric and is arguably of the same trend. Furthermore, I would argue that the potential benefits of genetic research would greatly outweigh the risk of unethical behavior; perhaps gene splicing might not seem so unethical as a means if we achieve the “ethical” ends of eradicating cancer or writing out genetic disease.

The genetic modification of human embryos was not completed with insidious goals in mind. In fact, this genetic modification of embryos focused on modifying the gene responsible for thalassaemia, a fatal blood disorder (Knapton). Several critics condemned this advancement of science, calling it a precursor to “designer babies” (Knapton). This criticism is made even more questionable as the method used to do the genetic modification, called CRISPR, was discovered, developed, and established by scholars at MIT in the United States (Knapton). This is not to say that the Chinese are using genetic modification for solely disease-eradication purposes; they have also used gene-editing to create miniature pigs called “micro pigs” to be sold as pets in China (Cyranoski). This practice, however, has not received the same backlash from westerners. It seems the arguments about “playing god” do not become so incensed regarding whether or not these findings are useful or can benefit humanity; instead, they seem to revolve only around whether or not these possibly unethical practices are performed on humans.

The Western use of the assertion of “unethical” behavior does not depend on whether or not something benefits the human race, but only if it tries to modify the human race in any way through genetics. Simply put, unethical behavior in this context is employed by European, Canadian, and U.S.-American critics in connection with eugenics. This moral ground is shaky at best and hypocritical at worst, especially since so many Western societies triumph at the eradication of disease through medication, vaccination, and other pharmaceutical research, but remain abhorrent to the thought of seeking to eradicate disease through genetic modification. This Western sentiment of a moral high ground is not founded on science; it is based on Eurocentric fears of eugenics. Arguments for and against genetic modification are based in eugenics; the Chinese seek to write out diseases for the betterment of the human race and Western critics condemn the process as seeking to unethically write out differences.

While it is still not entirely clear whether these new genetic tests will be as advantageous as they seem, as they have been conducted recently and we cannot yet see their long-term effects on individuals or populations, we can quantify the effects of other, older eugenics programs in China and their effects on the population from a social and cultural standpoint. First of all, there has been a sexual revolution in China that has been attributed to the availability of contraception that was provided as a result of population-controlling measures (Kleinman). This sexual revolution created the climate for a more vibrant youth culture, as well as increased advocacy for women’s reproductive rights (Kleinman). Global-social effects also include the recognition of China as a scientific power. Recently, and perhaps partially as a result of the acknowledgment of Chinese medicine as a viable and worthwhile pursuit, a Chinese woman was awarded the...
first Nobel Prize in China because of her contribution of an herbal-based cure for certain strains of malaria (Cyranoski). While this is not directly eugenics-based, I would argue that China’s inclusion in the global sphere of science is due to its widely known eugenics programs which put it on the map as a candidate in the competitor of global science.

Conclusion:
From genetically modified “micropigs” to curing hereditary disease, China’s relationship with eugenics is explicit and intricate. The field of eugenics has provided China with avenues to control their population, as well as curb an epidemic of disabilities and illnesses through prenatal screening. Researchers hoping to see the long-term effects of these advancements must now wait and see what Chinese eugenics and related programs have in store for the rest of the world, especially now that China has established itself as a serious global player in the field of science. There will always be outcries against genetic modification from western society, but that is mostly due to our troubled connections to eugenics. It seems that in order to allow China to advance, we should approach these research possibilities with an open mind and a cautious but supportive attitude. The Chinese future will be in part determined by its eugenics programs, and regardless of what these efforts turn out to be, they will definitely influence the trajectory of science and politics for the rest of the world, since China is a burgeoning scientific world power. Even though China’s relationship with eugenics is complex and controversial, it has been and continues to be an ever-present driving force in Chinese politics, culture, and society. It will certainly be interesting to see how this old field grows as it is instilled with new methods, principles, and discoveries.

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