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A Cultural and Macroeconomic Perspective on Mate Selection

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Abstract

This thesis uses cultural dimensions and macroeconomics to analyze six competing evolutionary psychology theories on human mating selection for 23 westernized countries. The theories were assessed based on objective measures from online public databases. A principle component analysis was conducted to reduce redundancy between the variables and provide a holistic understanding of the economic and cultural landscape. A mating index was composited of marriage and birth rate, which was then used in a regression model with the composite factors from the first stage of analysis. The social structural model received the most support from the data as it could account for cultural variation and influence on mating behavior. The good genes hypothesis, parental investment and developmental-attachment received partial support.

Keywords: Evolutionary psychology, culture analysis, economic, dimension reduction, Hofstede's cultural dimensions

Dedication

This is dedicated to my great-grandmother, Linnea Charlotte Hunt.

A woman to live up to.

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What are the factors that go into selecting a mate and having children? Are there different strategies employed based on varying cultural values and economic states? Or does selection criteria remain stable across all states? While many fields debate the factors that contribute to mate selection, the sub-field of evolutionary psychology focuses on human mate selection.

Evolutionary psychology is a relatively new branch of psychology that focuses on the tension between biological and external variables and how they affect behavior. It originated in the 1980's and grew in popularity due to the publication of Buss and Schmidt's *Sexual Strategies* (1993), after which several sub-theories emerged within evolutionary psychology that created internal debates between the hypotheses. The assumptions are based on whether heterosexual men and women are influenced by biological, environmental, or social pressures when selecting a mate and producing offspring. Bringing these underlying assumptions to the fore allows direct comparisons between the sub-theories to be made. In this essay, six competing hypotheses will be addressed in order to analyze mating behavior with the aim of unveiling which hypotheses are objectively supported.

Evolutionary Psychology Theory

One of the fundamental components in evolutionary theory is natural selection, which is free from future intention and biased towards parental generations. This blind process emphasizes traits from one-generation prior, so children inherit traits molded by the most recent environmental and biological pressures (Dennett, 1995). However, inherent to natural selection, children are not purely blended reproductions of their

parents. Deviation from past generations allows for variance within a species. This process is an algorithm for which randomness is accounted; otherwise species would not have the flexibility to sustain through environmental changes (Dennett, 1995). Natural selection favors those who have traits that are currently advantageous within the environment and those traits can be passed on to future generations.

There are three types of traits: positive, neutral and negative (Jablonka and Lamb, 2007; Hull, Langman & Glenn, 2001). Hull et al. describe a positive trait as being fundamental or advantageous to the survival of the species and a neutral trait as being neither useful nor a hindrance, whereas a negative trait would be a hindrance (2001). For example, if variable X was useful in foraging behavior, and variable Y was disadvantageous, then variable X would be labeled as positive and Y as negative. However, these traits cannot be categorized in a vacuous manner; rather, past and current environmental pressures are the determinants of categorical placement. Therefore, evolution cannot be described as predetermined in relation to the state of a future environment, unless the future environment is a product of a stabilized environment that the organism is already adapted to. If the organism is unable to successfully attain food or a mate, the likelihood of its genetic sequence (DNA) being passed on to further generations decreases. Thus an evolutionary success is defined as the ability to pass on an individual's genetic sequence to the next generation. An evolutionary success is what evolutionary psychology (EP) focuses on, specifically regarding mate selection (Buss, 2007).

Sexual Strategies Theory

David M. Buss, and later his collaborative work with David P. Schmitt, laid the groundwork for mate selection and evolutionary psychology (Buss, 1985). The study of mate selection is the product of the incorporation of psychology and biological sciences that focuses on how individuals can effectively spread their DNA to further generations (Buss and Schmitt, 1993).

The environment holds a limited amount of resources and as a consequence it creates competition within and between species for those resources (Darwin, 2009/1859). Additionally, there are other natural limitations, such as in the cognitive (Pohl, Erdfelder, Hilbig, Liebke and Stahlberg, 2013) and reproductive realms (Gangestad and Simpson, 2000). The cost-benefit model has been suggested as a strategic model to decipher how one should best utilize aforementioned resources (Cosmides and Tooby, 1994; Gangestad, 1995). This model has been applied when assessing the original sexual strategies theory as it highlights the biological difference in quantity versus quality in the human reproductive systems (Buss and Schmitt, 1993).

The cost-benefit model would predict that if one has reproductive equipment that produces quantity then it would be advantageous to use multiple short term strategies to maximize the chance of producing offspring into the next generation. Given that men have continual sperm regeneration, men would be expected to employ multiple short-term mating opportunities to increase the likelihood of their offspring maturing to adulthood. Given the biological tie between reproductive equipment and the cost-benefit model, Buss and Schmitt theorized that men would tend to favor short term mating strategies over long term mating strategies (1993). Thus, they defined a short term

mating (STM) as a strategy that focused on a limited time period with the goal of copulation (Buss and Schmitt, 1993). In contrast women are born with all of the reproductive matter that they will ever possess, so the cost-benefit model would predict that they should favor a quality strategy (Buss and Schmitt, 1993; Schmitt, 2005; Symonds, 1979). Similar to the association between the quantity strategy and STM, the quality strategy is typically associated with long term mating (LTM) that focused on a long time period, with copulation and cooperation as the goal (Buss and Schmitt, 1993). Additionally, the female is expected to favor this strategy given that she is biologically tied to the offspring during pregnancy and is traditionally a necessity for the first year(s) of life (Buss and Schmitt, 1993). While the sexual strategies theory does predict that the sexes will favor their respective strategies based on their reproductive matter through the cost-benefit model, it should be noted that both sexes, in a heterosexual paradigm could not both exclusively favor their strategy. Thus, Buss and Schmitt emphasize that these are favored strategies and not mutually exclusive strategic categories (1993).

In order to understand biological tensions, the sex ratio theory emerged as an extension of the sexual strategies theory. The sex ratio theory predicts that when there is an increase in men over women within a population, there will increased levels of monogamy, or long-term relationships, given that there are not enough women for every man, so one woman per man would increase the likelihood of offspring for both partners in this environment (Griskevicius, Tybur, Ackerman, Delton, Robertson and White, 2012; Schmitt, 2005). The opposite is true for the inverse; when there are more women than men in a population, there will be an increase in promiscuity as men may be able to mate with multiple women which would increase the likelihood of offspring for each

male (Schmitt, 2005). It should be noted that an assumption of this theory is that both sexes favor their perspective strategies and population ratio predictably dictates fluctuation in monogamy versus promiscuity and not a fluctuation in favored strategies within the sexes.

Sex ratio has wider effects than strictly monogamy versus promiscuity. When the sex ratio is high (more men) interpersonal-intimate relationship violence (D'Alessio and Stolzenberg, 2010) and spending increases (Griskevicius, Tybur, Ackerman, Delton, Robertson & White, 2012) which is hypothesized to suggest that as the amount of men increases, competition also increases and violence and monetary spending are potential side effect of this relationship. However, in direct contrast, in an online dating study where the sex ratio was particularly low (646 available single men for 1,000 women) women were still the choosier sex even though sex ratio theory would suggest that men would have the advantage (Bokek-Cohen, Peres & Kanazawa, 2008). This particular study supports the sexual strategies theory from Buss and Schmitt and that woman by and large prefer to use a long-term strategy (1993).

Therefore, by combining sexual strategies theory with sex ratio the expectation is that limited variation within the sexes and fluctuation in strategies is primarily based on population ratio. These two categories need not be mutually exclusive, where serial monogamy could allow for both strategies to be incorporated with a median time frame. This prediction as a whole assumes a biological saliency of understanding human mating behavior across varying cultural and economic states. The next section will evaluate the relationships between the sub-theories of sexual strategies and the opposing theoretical model for understanding human mating behavior.

Mating Strategy Theories

This section will address the four sub-theories of the sexual strategies theory as well as an alternative model to the sexual strategies theory, the social structural model. Each of which will be addressed based on their theoretical predictions and assumptions. The four sub-theories of the sexual strategies theory are: the good genes hypothesis, parental investment model, developmental attachment model and the strategic pluralism model.

Good Genes Hypothesis versus Parental Investment Model. The good genes hypothesis and the parental investment model are more alike than they are different and are both biologically driven. Both of the models predict that men will favor STM, however they differ in that they do not agree on what women will favor. The good genes hypothesis suggests that a few days prior to menstruation (a sensitive time window when a woman is most likely to become impregnated) she will be more attracted to masculine features (Gangestad, Garver-Apgar, Simpson and Cousins, 2007) and be able to discriminate between immune system cues through body odor (Wedekind and Furi, 1997; Wedekind, Seebeck, Bettens and Paepke, 2006). This means that at the most reproductive-opportunistic time, she is more sensitive to advertising characteristics indicating healthy genes. During this time sensitive period, women report that they are more willing to engage in a short sexual encounter with men exhibiting masculine characteristics than at other time during the menstrual cycle (Gangestad and Simpson, 2000). Furthermore, not only do they experience an increase in desire for hyper masculine men, their response is not necessarily dependent on whether they are in a long-term relationship or not (Greiling and Buss, 2000). This means that women may use

deviant strategies to secure quality genes in a short-term mating strategy independent from whether they are also engaged in a long-term strategy. Thus good genes hypothesis predicts that women will seek attractive mates for reproductive benefits (Gangestad, 2007).

There are several variables and superficial cues that are associated with health indicators. First, skin can indicate age and health (Symonds, 1995). Men prefer women within an age category that is correlated with their reproductive fitness and as such, women in their 20's bear the most offspring than any other age category (Delton, et al, 2006). Skin is elastic and loses elasticity over time, so skin tautness becomes a good indicator of age (Gallup and Frederick, 2010). Additionally, the lack of sores or other blemishes is preferred, not due to a direct indicator of health, but because it represents an apparent advertisement of ill health (Zebrowitz and Rhodes, 2004).

Second sex specific characteristics are assessed; when men are assessing women, men tend to prefer a more neotenized face, which includes a proportionally large forehead, big eyes, small nose and mouth, similar ratios that are found on a baby (Rhodes and Zebrowitz, 2002; Zebrowitz, Olson, and Hoffman, 1993). Women find men with a pronounced jaw line more attractive and masculine, than softer, more feminine features (Rennels, Bronstad and Langlois, 2008). Third, both sexes find those who have bilateral symmetrical faces or average looking faces to be more attractive (Grammer and Thornhill, 1994). Averageness is a concept based on aspects of the face as well as the global face; for example the most common nose, mouth, etc. is found to be more attractive than the mouths and noses that are atypical (Vingilis-Jaremko and Maurer, 2013). This could be due to several reasons, the more typical the component(s) are the

more familiar a face will appear to be, therefore familiarity may be selected for instead of novelty or dissimilarity (Halberstadt and Rhodes, 2000).

Fourth, as stated prior, women can vary on which strategy they use based on their menstrual cycle, either looking for a short or long term partner, where the former would support their desire for good genes for their offspring. The latter can be seen in a study where Tadinac and Hromatko found that in assessing groups of people on attractiveness, men found more women to be attractive within a group than women found men to be attractive, supporting that women can be more choosy than men (2004). Additionally, Gangestad and Simpson found that when women wanted to engage a short-term relationship they were more likely to desire a very attractive man and very attractive men had a higher tendency of investing less time in parenting (2000).

A secondary subset theory to the good genes hypothesis is sperm competition. (Shackelford & Goetz, 2006). This is documented in many animals and is often found in animals that have unequal sizes between the sexes and where males have proportionally large scrotums (Shackelford & Goetz, 2006). Human males and females are closer in size than other primates where promiscuity is particularly high; humans do have a sex body size difference that may indicate a biological tendency for promiscuity over monogamy (Ryans, 2011). Typically monogamy is found only in species that are proportionally similar between the sexes (Ryan, 2011). Due to this biological tendency for promiscuity, sperm competition arises where women near menstruation would benefit from sperm-to-sperm competition where the best sperm permeates the egg (Goetz, Shackelford, Platek, Starratt & McKibbin, 2007; Ryan, 2011).

The parental investment model predicts that the sex investing more in the offspring will be the more selective of the sexes (Trivers, 1972). Women out of necessity have a higher investment in the offspring and thus are more selective than their male counterparts (Schmitt, 2005). One of the selection criteria is good character, characteristics such as an implied good nature and helpfulness, which may translate into good partnership and helpfulness within a family (Blesek-Recheck, Remiker, Swanson, & Zeug, 2006). In opposition men are less selective based on character and value physical qualities such as attractiveness above all else (Gottschall, 2007). In a preferred mate quality prioritization task men rate attractiveness at the top of their list (Buss and Barnes, 1986). However, this is not simplifying men to shallow seeking behavior while women orientate towards deeper-character driven individuals. On a task similar to the one aforementioned, women rate wealth or “high-overall income” at the top of their priority list (Buss and Shackelford, 2008). The parental investment model explains this divergence through the cost-benefit analysis similar to that of Buss’s (Schmitt, 2005).

Women have a higher investment in the offspring given their biological binding and that they are not equipped to produce a large set of offspring, relative to the male, which may result in her interest in seeking partners with characteristics associated with high investment such as cooperation (Buss and Shackelford, 2008). Additionally women may seek men who have high financial wealth and stability to provide long-term support during child rearing (Buss and Shackelford, 2008). Further, the shallow seeking male may not be as shallow as previously thought; there is supportive data that global attractiveness is an advertisement for good health (Gallup and Frederick, 2010). If attractiveness is a signaling system, then the male would be focusing on health

advertisements rather than superficial qualities. Zebrowitz found that in the lowest physical attractiveness quartile there is a significant relationship between dissymmetry and low intelligence and health (2004). Therefore, again, the desire to choose based on levels of attractiveness may indicate a value towards health, and intelligence. Also, skin quality and pigmentation can reveal a large array of medical ailments, which can flag would be suitors of individual health impairments (Gangestad, Haselton and Buss, 2005).

The parental investment model predicts that women will favor long term strategies over short term while the good genes hypothesis favors a mixed strategy approach. Thus, the parental investment model would expect that women would vary very little across cultural and economic states whereas the parental investment model would expect that women would use a mixed strategy approach. Thus, the parental investment predicts a limited range of variation in strategizing and the parental investment model incorporates an increase in variation. However, neither of the models explicitly discuss cultural and economic pressures on these strategies, thus the expectation would be that women are either consistently predictable or vary predictably based on biological factors, and external pressures do not influence their behavior enough to incorporate them into the model.

The purpose for understanding how economic resources effects mating behavior is based on the fact that there are limited amounts of resources that create within species competition (Darwin, 2009/1859). Given that this is not addressed it cannot be understood whether resource availability alters mating behavior, or if it is salient across levels of accessibility. Additionally, given that cultural values are not assessed in these models, they cannot provide insight into how value systems may influence mate choice.

Buunk and Solano focused on parental guarding, which is when parents intervene and prohibit their children from dating a specific individual, or at least make dating for their children challenging (2012). They found cross-cultural differences in parental guarding of mate choice where some cultures have a higher prevalence of parent guarding which can affect mate choice (Buunk and Salano, 2012), potentially above and beyond biological drives depending on the strength of the value system. For example, certain religious value systems may alter mate selection and in extreme situations remove the possibility of mating altogether, such as nunship. This example shows that cultural values can alter who and with whom members of the culture can mate. One of the assumptions of these two models is that biological drives supersede cultural and economic states. Thus, our first question is whether strategies differ across cultural and economic states or do they remain constant?

Developmental-attachment Model versus Strategic Pluralism Model. Both the developmental-attachment model and the strategic pluralism model are interested in how mating behavior changes in relation to resource availability. The developmental model's approach is derived from attachment theory and relating it to mating strategies while the strategic pluralism model is derived from the sexual strategies theory.

The developmental-attachment model infers that parental investment shapes their offspring into either being more or less promiscuous (Belsky, Steinberg and Draper, 1991). As stated prior, there are limited amounts of resources and this model capitalizes on that point: in environments with less availability to survival resources, parents have less emotional and cognitive resources available for their offspring due to the struggle in attaining as much material resources as possible (Schmitt, 2005). As a consequence of

their investment in attaining resources, their children develop in a state of neglect and form insecure attachment (Belsky, et al. 1991). Due to the insecure attachment to their parents, the children will develop and model similar behavior to potential mates and engage in more promiscuous behavior (Belsky, et al. 1991). Therefore the correlation is that due to lack of resources and less parental investment, offspring later engage in more promiscuous behavior. A similar model proposed by Chisholm (1996), is that when mortality rates are high generally resource acquisition is difficult, and due to this relationship the preferred mating strategy would be to mate young and often to increase the likelihood of a reproductive success (1999).

Koehler and Chisholm found that men who have had early psychological stress have slightly different mate preferences than men who do not have early psychological stress (2009). Men who had high psychological stress did not find women with masculine features to be attractive, where low stressed individuals did not discriminate in this manner (Koehler and Chisholm, 2009). In a separate experiment, Coal and Chisholm focused on psychological stress in a variety of forms: divorce, one-parent families, and low access to resources (2001). They found that early psychological stress is correlated with an early onset age of menarche and higher rates of low birth weights as well as higher birth rates, which was theorized to be a trade-off from waiting to have higher quality offspring later, to having low birth rate offspring earlier in life (Coal & Chisholm, 2001).

In support of the parental attachment model, these studies suggest that when young children go through high psychological stress it alters their mating practices later in life, where they invest in offspring at a younger age than their peers who did not have

high psychological stress. Children who grow up in families from divorce have higher rates of teenage pregnancy as well as earlier onset of intercourse than their peers (Aseltine & Doucet, 2003). Additionally men who have grown up in psychological stressful situations later show signs of intimacy issues with their future partners making it challenging for them to commit to a long term partner (Land, 2009) which can increase the prevalence of promiscuity, supporting the parental attachment model. Similarly in an experiment comparing parent-child attachment and spousal attachment, individuals who had insecure attachment styles with their parents had higher rates of insecure attachments with their spouses (Frazier, Byer, Fischer, Wright and DeBord, 1996). Therefore this model would predict that insecure parental attachment early in life can lead to earlier menarche, low birth rates, early onset age of first pregnancy and insecure spousal attachment with future partner(s). However it should be noted that one of the assumptions of this model is that if resources are low most parents are not able to form secure attachments with their children and if resources are high most parents will form secure attachments with their children.

In direct opposition, the strategic pluralism model posits that as material goods become more difficult to obtain, monogamy will increase due to a higher need for bi-parental investment (Gangestad and Simpson, 2000). This model is in direct contradiction to the parental attachment model, where during environmental or economic hardships, parents would invest less thus creating promiscuity whereas this model suggests that it bonds families and encourages monogamy (Schmitt, 2005).

Gangestad and Simpson (2000) further hypothesize that as the availability of resources becomes more prevalent, promiscuity will increase. Promiscuity could increase

in a flourishing economic landscape according to this theory because both sexes could invest in short term strategies because they would not be dependent on each other for economic or resource gain. However, in economic hardships both men and women spend less money in all financial categories with the exception that women increase their allocation of resources to beauty enhancement products, which has been coined *the Lipstick Effect* (Hill, Rodeheffer, Griskevicius, Durante and White, 2012). Thus when resources are limited women show predictable signs that they want to increase their appearance to gain attraction from male suitors in hopes of investing in a long-term relationship (Hill, et al. 2012).

The social pluralism model supports the idea that in economically challenging environments there would be high level of bi-parental investment. The Lipstick Effect further substantiates this point, pointing to women who are typically saving money in an economic hardship allocate more funds towards beautify enhancers in order to secure a mate, who potentially could provide access to more resources. Additionally, this model agrees with the original sexual strategies theory and that women tend to prefer a LTM strategy as indicated through the lipstick effect.

The two models are in direct contrast as the developmental-attachment model predicts that when resources are low, marriage rates will decrease with either an inverse relationship to birth rates or no relationship to birth rates, whereas the strategic pluralism model predicts that when resources are low marriage rates will increase and birth rates will increase together. Thus the second question is whether marriage and birth rates increase or decrease when resources are low?

Sexual Strategies versus Social Structural Model. As discussed prior, the sexual strategies theory encompasses the four sub-theories aforementioned and in combination predicts low variability in mating strategies due to the strength of reproductive differences. While some variability is expected, primarily understood by the good genes hypothesis, the sexual strategies theory maintains the position that mating strategies are biologically bound and external pressures have a minimal effect. The social structural theory takes an alternative approach and expects that while biological variables will effect mating behavior, external variables such as cultural influence will contribute to mating behavior.

The social structural model theorizes that tasks were originally divided among the sexes based on strengths and weaknesses, where men were the hunters and women were the gatherers (Schmitt, 2005). Value may not have been originally attached to the assigned tasks, but over time the tasks divided the sexes into gendered categories through socialization and learning, not due to sexually dimorphic brain structures (Eagly and Wood, 1999). Also as noted previously, given the size difference between the sexes it allowed for initial physical domination from the male sex which transferred into patriarchal social hierarchies that are prevalent still in current cultures.

While at first glance there appears to be mating strategy differences correlated with gender (which is often conflated with sex differences), on closer inspection when gender differences are collapsed and mating strategies are categorized based on personality traits alone, personality is a better predictor of mating strategy than sex is (Josephs and Shimberg, 2010). Further Josephs and Shimberg found that mating strategies is more dependent on relative hormone levels rather than sex differences

(2010). Therefore, women who have lower levels of oxytocin and higher levels of testosterone in their system relative to other women may orientate towards a more promiscuous strategy and the inverse follows for men (Joseph and Shimberg, 2010). Although this indicates that hormones themselves are the ultimate predictor of mating strategies; Josephs and Shimberg do not hold hormones in isolation and argue that environmental variables shape individual behavior and personality and biology alone cannot predict mating strategy (2010). Additionally, the social structural model also wants to de-emphasize sex based categories and refocus on gender based categories and how genders are formed and informed through societal values and pressures. Thus, this supports that men and women are not driven towards engaging in a given sexual strategy dependent on sex, gender or even hormonal relevance, but rather a combination of the two with environmental variables influencing and shaping the individual. Given that behavior cannot be understood vacuously and we live in a social world, societal values must be taken into account in order to understand mating behavior.

While the sexual strategies theory expects little to no variation in mating strategy differences across varying cultural and economic states, the social structural model expects a wider range of differences. Thus, our third question is do mating strategies vary or remain stable across cultural states?

Table 1. Theoretical Models and Summary Descriptions

Theory	Description
Sexual Strategies	Due to reproductive equipment and quantity versus quality, men will favor STM and women will favor LTM.
Good Genes Hypothesis	STM strategies will be used by both sexes at opportunistic time periods to ensure the best quality DNA for offspring. This strategy suggests that birth rates and marriage rates will not be correlated.
Parental Investment	The sex that invests more into the offspring will be more selective in mate choice. Women will be more selective and desire LTM.
Development Attachment Model	When environmental conditions are harsh, children will experience stress and are more likely to not receive comfort from parents and as a result will develop an insecure attachment. Therefore when resources are less available birth rates will increase and marriages will decrease.
Strategic Pluralism Model	As environmental conditions increase in difficulty, bi-parental investment is advantageous for the development of the offspring.
Social Structural Model	Social, environmental and biological variables must all be taken into account in order to understand mating behavior. As such, social variables will influence behavior.

Hofstede's Six Cultural Dimensions

Geert Hofstede started his work on cultural dimensions through dimension reduction analysis in 1960 for IBM, to provide a framework in which to compare multiple cultural differences for large organizations. IBM had 117,000 employees across multiple countries and Hofstede surveyed the employees on values and normative behavior to assess the differences between the countries. The dimensions have been studied heavily to assess the validity of his data, which have been strongly supported (Lažnjak, 2011; Blodgett, Bakir & Rose, 2008; Yoo, Donthu & Lenartowicz, 2011; Nota,

Arrindell, Soresi, van der Ende & Sanavio, 2011). It is also worth noting that these numbers are stated preferences by members of these cultures, not recordings of actual behaviors. However, until we have other measurements these indices will have to suffice to measure cultural rule governed behavior.

Power Distance Index (PDI). This dimension describes how members within a culture accept how power is distributed (Hofstede, 2012). Countries that have a low PDI strive for equality amongst the members and demand reasons for unequal treatment and dispersion of power. For countries with a high PDI the members are comfortable with unequal dispersions of power and accept structured hierarchies. For example, China receives a PD score of 80, which would represent a country that is comfortable with a rigid cultural structure and the members do not attempt to decrease unequal power relationships, whilst Sweden receives a PD score of 30 and its members attempt to reduce unequal treatment amongst its members. Of course, the Chinese attitude towards the ruling class could be due to other factors such as fear of the ruling party, fear of retribution (see for example 5 Myths About the Chinese Communist Party, Foreign Policy, 2011). Nonetheless, in this particular example the attitude reported could be said to be a rough approximation of the behavior observed in Chinese culture.

Individualism versus Collectivism (IDV). This dimension represents whether the members within the culture are focused on individuality or the collective whole (Hofstede, 2012). A high score on this dimension would express individuality where each individual is responsible for themselves alone or very close familial members, while a low score expresses collectivism. Collectivism differs conceptually and in application where the individual is not more important than the whole and the society is a tightly knit

framework of loyalty where the members care for each other unconditionally (Hofstede 2012). For example, Costa Rica has a IDV score of 15 expresses that trust and building long lasting relationships is paramount, in contrast the United Kingdom scores an 89 on IDV which expresses a strong orientation to the individual and their immediate families.

Masculinity versus Femininity (MAS). This dimension represents how the collective whole orients towards either high achievement affiliation (masculinity) or cooperation (femininity). A high score is represented by masculinity that is associated with dominance, achievement, heroism, a defined winner, assertiveness, competitiveness and material rewards; while a low score is represented by femininity which is associated with passivity, a preference for cooperation, modesty, caring for the weak and focusing on the quality of life for all (Hofstede, 2012). The latter is also more consensus-orientated ensuring that all members are taken into account. It is important to note that these gendered terms and definitions are not systematically synonymous with common gendered associations and the purpose for not amending these labels is to keep consistency between this paper and the Hofstede dimensions. An example for this dimension would be extremes in Japan and Denmark. Japan receives a MAS score of 95, showing the culture's high need for success and achievement, however this is a highly collectivist society meaning that their masculinity score is represented through group competition where loyalty within groups is paramount; while Denmark receives a MAS score of 15 which represents a cultural desire towards cooperation and increasing the quality of life for its members.

Uncertainty Avoidance Index (UAI). This dimension measures how uncomfortable its members are with uncertainty and ambiguity (Hofstede, 2012). Given

that the future cannot be known, the question arises as to how a culture deals with this issue. A high score in UAI represents a culture that has rigid codes of belief and behavior and is intolerant of unorthodox behavior and ideas, taking a more conservative direction; while a low score represents a more relaxed attitude towards the future and focus on practice rather than principles (Hofstede, G). For example, Greece receives a 100 on UAI which suggests that they maintain a rigid planning structure for the future (whether the structure is still practical or not) where its members are hardworking and precision is the norm, while Jamaica receives a 13 on the UAI which suggests that deviance from the norm is easily tolerated and schedules are flexible.

Pragmatic versus Normative (PRA). This dimension expresses how a culture deals with its past and current practices while being future orientated (Hofstede, 2012). A high score, which is represented by the pragmatic label, encourages modern education as a way to prepare for the future, while a low score, represented by the normative label, expresses a preference to maintain traditions and norms while being semi to fully resistant to change. For example, Germany receives a score of 83 on the PRA which indicates that the culture is pragmatic which means that the truth is contextual and time orientated and can easily adapt to change while Iceland receives a score of 29 on PRA expressing normativism which means that its members are orientated towards an absolute Truth and respect traditions and focus on achieving quick results.

Indulgence versus Restraint (IND). This dimension expresses how a culture handles “basic human drives” (Hofstede, 2012). A high score is represented by the indulgence label, and allows for free gratification and enjoying life, or a more hedonistic approach, while a low score is represented by the restraint label, which focuses on

suppression of gratification and regulating themselves through strict social norms. For example, Mexico scores a 97 on IND which indicates that the culture is indulgent and places a higher value on leisure time and have optimistic attitudes, while Russia receives a score of 20 on IND which indicates restraint, which means that the members follow social norms and are restricted by them, and if broken feel that they are wrong.

Hypothesis and Research Questions

After assessing six theories and models there are many questions that must be addressed. The questions proposed are either directly inferred from the theoretical model itself or proposed given a wider perspective on the mating paradigm as a whole.

Additionally, given that much of the data discussed prior is based on small samples and self-reports, this analysis is based on objective measures of mating behavior across 23 different countries over a ten-year time span. Furthermore, the Hofstede cultural dimensions are a product of over 50 years of study that have been validated through external research. While self-reports are useful towards the efforts of conceptualizing a phenomenon there are often discrepancies between projected ideas and factual behavior. For example in a study where women were surveyed to ask how many children they would have liked to have compared to how many they actually had there was a large gap between the ideal and reality (Livingston, 2014). The following sections describe the research hypotheses assessed in this study:

Hypothesis 1: Good Genes and Parental Investment

According to the good genes hypothesis we would expect to see some mating strategy variation based on the influence of ovulation. Ovulation has shown to effect whether

women want to engage in long or short term mating strategies and the type of man that she desires throughout her menstrual cycle. However, the parental investment theory expects minimal mating strategy difference due to the biological tie that women have to their offspring and that this biological tie will supersede any other variables. Thus our first question is whether mating strategies vary or remain stable across varying cultural and economic states?

The good genes hypothesis suggests that both women and men strategize on how to get the best genes for their offspring, even to the point of women, at times, using deviant strategies when she is in a monogamous relationship to stray to capture better genes. When this occurs this is considered a cuckold, where the male in the committed relationship does not know that they are investing in offspring that are not genetically theirs (Geary, 2002). Thus the good genes hypothesis would expect that births would increase in a more flexible social structure as opposed to a rigid structure where attaining desirable DNA may be more challenging. Therefore, the good genes hypothesis would expect that births would increase in a non-normative society that allowed for strategic variation, where the parental investment theory would expect that births would increase in a normative society.

- R1: Do mating strategies vary?
- R2: Are there more birth in normative or non-normative cultures?

Hypothesis 2: Developmental-attachment and Strategic Pluralism

According to the developmental-attachment theory when resources are low there will be an increase in promiscuous behavior. This will be due to the amount of time and energy parents will be forced to allocate their time towards gathering resources rather than spending time with their children. As a result of this, children will form insecure

attachments with their parents and use this as a model for behavior later in life. Given this, it will be harder for these children to form secure attachments with other adults or partners and will be more likely to engage in promiscuous behavior or STM rather than long term monogamous relationships. The strategic pluralism predicts the exact opposite, predicting that when resources are low, bi-parental investment will be advantageous so monogamy should increase. The former does not necessarily link monogamy with birth rates while the latter does.

- R3: Does monogamy increase or decrease when resources are low?
- R4: Do birth rates increase or decrease when resources are low?

Hypothesis 3: Sexual Strategies and Social Structural

According to the sexual strategies theory due to the biological differences of reproductive equipment, women will tend to favor long term strategies over short term where the inverse is true for men. Given the strength of this biological influence it will triumph over all external variables and strategic variation should be minimal. This is supported through women predicting that they desire economic wealth and good character characteristics whereas men prefer physical attractiveness features, where the former indicates variables that are useful in long term partnering and the latter values short term gratification. The social structural theory holds that the sexual strategy theory is too limited and focuses too heavily on the biological and emphasizes the importance of incorporating social and biological factors. Thus, the social structuralists would expect that cultural values would influence mating behavior while the sexual strategists would not (or expect a very limited effect).

- R5: Do cultural values effect mating behavior?

Methods

Data from the following twenty-three western countries was collected: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. The sample was purposefully culturally homogenous in order to detect the effect, if one existed, of environmental factors on mating behavior; as well as a convenience sample based on data availability. Additionally, multiple cultures were examined in order to address some of the EP theories addressed prior. However, in order to capture the cultural difference between countries, the Hofstede 6 Cultural Dimensions (Hofstede, 2012) was used to assess cultural difference within the sample.

The economic variables were collected from online public databases: WorldBank.org, CIA Factbook, Indexmundi.com, destatis.com and countryeconomy.com¹. The variables collected were selectively chosen based on prior research focuses on environmental factors that influence mating behavior, such as in Schmitt's (2005) article on sociosexuality which took a self-report measurement of 48 nations on individual's mating strategies. Schmitt examined whether a nation was more monogamous or promiscuous in sexual relationships, while addressing several evolutionary psychology theories such as sex ratio theory, parental investment and strategic pluralism (2005). However, many of these theories rest on environmental or economic variables that project how individuals may behave in different economic environments. For example, in the strategic pluralism theory when economic resources

¹ See appendix 1 for variable source list.

are low, bi-parental investment should increase in order to increase the chances of the offspring surviving during hardships (Schmitt, 2005). However, Schmitt (2005) and Barber (2003) both found that when GDP is low, the onset age of pregnancy decreases, resulting in a higher rate of pregnancy amongst teenage girls. Hill, et al found that when economic resources are low, people spend less money on average on most products, with the exception of enhancements; women purchase more beauty products which has been termed the “lipstick effect,” in order to increase their chances of accessing men (2012). While the exclusive use of economic variables does provide insight into how they influence behavior within a short time period, the addition of cultural variables provides a consistent framework, as cultural values do not fluctuate as quickly as economic variables do (Hofstede, 2012). Therefore, this study includes Hofstede’s cultural dimensions and microeconomic variables representing environmental factors. The economic variables included are: Gross domestic product (GDP), the Gini index (GINI) and unemployment rates (UR). These variables together provide a collective representation of the economic status of a given country². In particular, the GDP measures a country’s economic performance in monetary terms, and therefore provides a wealth- snapshot of the country as a whole as well as relative spending behavior. This is calculated by *calculated compensation of employees + gross operating surplus + gross mixed income + taxes less subsidies on production and imports*. This variable is of particular interest given that much of the theoretical work hinges on how people’s

² Inflation rates were not included due to a large number of extreme values during the screening process. There were four out-of-range values for inflation and after computing a logarithmic variable for inflation; Iceland, Luxemburg and Ireland went through an economic hardship that skewed the results for this study. Therefore, inflation was not used.

behavior shift in accordance to accessibility to resources. The Gini index provides a landscape of how income is dispersed among a country's members. It ranges between 0 and 100 points. Higher scores represent large income inequality similar to a monopsony, where only a few people control the country's wealth and consumption. Low scores represent high-income equality equal dispersion of wealth. Unemployment rates describe the prevalence of individuals that are without work, (i.e. have limited or no access to resources). Traditionally unemployment rates increase as cultures or countries experience economic hardship (Evans-Lacko, Knapp, McCrone, Thornicroft, & Mojtabai, 2013). The dataset also includes sex ratio for the year 2010 to assess the sex ratio theory in relation to birth rates and economic effects. Additional years were not accounted for due to the lack of consistency in data availability for all of the countries analyzed.

In all analyses the dependent variable corresponds to a mating index (MI) computed using a country's marriage and birth rates, ($r = .158$, $p = .01$). The index ranges from 11.41 to 22.7 (Mean = 15.99, SD = 2.25) and higher numbers imply an increase in both marriage and birth rates. The use of marriage and birth rates together allows for an objective assessment of mating behavior, directly (birth rates) and indirectly (marriage rates). The marriage rate variable is an approximate measure of monogamy versus promiscuity, where high rates of marriages will be interpreted as high rates of monogamy, whereas the opposite will be true as well. In so doing, this variable presents an alternative to measures of mating behavior based on self-reports.

Study 1: Methods and Results

Given that the countries were chosen based on homogeneity, the cultural and economic variables had high levels of multi-collinearity and could not be treated as

independent measures. Additionally, given that there were nine explanatory variables the degrees of freedom were suffering from too many explanatory variables. Thus, it was essential based on these two points that a dimension reduction analysis must be conducted to reduce redundancy between the variables, as well as, increase the degrees of freedom. This also aided in understanding the competing hypothesis for mating behavior, as a principle component analysis could provide an overview of not only how mating practices shifted in accordance with accessibility to resources, but what the economic and cultural holistic picture looked like if these shifts occurred. For example, by combining culture and economic variables relationships can be unveiled such as whether resource accessibility (GDP and unemployment) and pragmatism have a relationship, and if so how to they relate? This strategy is useful in answering questions in hypothesis two and three.

Data Screening

The data was first screened for outliers; there were four divorce variables that were out-of-range, which were identified and recoded as missing data. The minimum amount of data for principle component analysis was satisfied, with a final sample of 299 (using replace with mean for missing data points) (MacCallum, Widaman, Zhang & Hong, 1999). Additionally, sex ratio was excluded from the analysis given that only one year would be contributing to the model, whereas all other variables had at the minimum a ten year range.

Principle Component Analysis (PCA)

Initially, the factorability of the three economic variables and six cultural variables was examined. Several well-recognized criteria for the factorability of a

correlation were used. All nine variables had a correlation coefficient of at least .3 with at least one other item suggesting reasonable factorability. Second, the Kaiser-Meyer-Olkin measure of sampling adequacy was .593 which meets the suggested recommended value of .5, and Bartlett's test of sphericity was significant ($\chi^2(36) = 340.869, p < .01$) (Fields, 2009). Finally, the communalities were all above .3 (see Table 2), further confirming that each item shared some common variance with other items.

A principal component analysis (PCA) with a varimax rotation was used to identify and compute composite factors from all economic and cultural variables using SPSS Version 21. A total of three components were extracted and they explained 69.86% of the variance, with the initial eigenvalues showed that the first factor explained 39.28%, the second factor 16.41%, and the third factor 14.17%. All items had primary loads over .6 and only three item had a cross-loading over .3 [Power Distance (.391), Masculine Feminine (.402), and Uncertainty Avoidance (.370)], however all three variables had strong primary loadings (PL), and goes as follows: Power PL of .761, Masculine Feminine PL of .715 and Uncertainty Avoidance PL of .854. The factor-loading matrix and components extracted are presented in Table 2.

Table 2.

Factor loadings and communalities based on a principle components analysis with varimax rotation for 9 items from macroeconomic and cultural variables (N = 299)

	Component		
	1	2	3
GDP	-.766		
GINI			.784
Unemployment	.635		
Power Distance	.761		
Individualism	-.808		
Masculine Feminine		.429	.715
Uncertainty Avoidance	.854		
Pragmatism		.902	
Indulgence	-.730		

Note. Factor loadings <.30 are suppressed

As shown the first factor is characterized by a combination of GDP (-), unemployment (+), power distance (+), individualism (-), uncertainty avoidance (+), and indulgence (+). Only pragmatism (+) characterized the second factor or component. Finally, the third factor is comprised of GINI and masculine feminine.

Composite scores were created through saving variables as a regression for each of the three components, based on the means of the items that had their primary loadings on each component. As required by the Varimax rotation, the three components do not correlate with each other. According to Table 2, the first component is characterized by cultural rigidity (power distance, and uncertainty avoidance enter positively, and individualism and indulgence enter negatively) and by economic inefficiency (GDP enters negatively while unemployment rates enter positively). Accordingly, this factor is called *Rigidity and Inefficiency (RI)*. Thus, a high score in RI indicates a culture that has limited resources, unequal power dispersion, is collectivist, show restraint towards human desires and is rigid in their beliefs and traditions. A low score in RI indicates a culture

that has an abundance of resources, individualistic, has equality amongst members, indulgent in relation to human desires and is open to new ideas.

The second component is characterized by pragmatism and its counterpart conservatism, as pragmatism is the only loading factor. Accordingly, this factor is called *Pragmatism (P)*. A high score in P indicates a culture that values modern education, is highly logical and focuses on long term planning, while a low score indicates a value towards traditional problem solving strategies and focuses on short term planning.

The third component is characterized by competitiveness (masculine and feminine) and by economic monopsony (GINI). Accordingly, this factor is called *Competitiveness and Inequality (CI)*. A high score in CI indicates a culture that is highly competitive with a defined winner and an unequal dispersion of resources amongst its members, whereas a low score indicates a culture that focuses on cooperation and equal resources dispersion amongst its members. Table 3 presents the label for the three components and the variables that comprise it along with the communalities based on the PCA.

Table 3.

Communalities based on a principle components analysis with varimax rotation for 9 variables (N = 299), GDP, GINI, unemployment, power distance, individualism, uncertainty avoidance, indulgence, pragmatism, masculine/ feminine

Component	Label	Contributing Variables	Communalities
1	Rigidity and Inefficiency (RI)	GDP (-)	-.766
		Unemployment (+)	.635
		Power Distance (+)	.761
		Individualism (-)	-.808
		Uncertainty Avoidance	.854
		-Indulgent	.730
2	Pragmatism (P)	Pragmatism (+)	.902
3	Competitiveness and Inequality (CI)	GINI (+)	.784
		Masculinity (+)	.715

Bartlett's test of sphericity $\chi^2(36) = 340.869, p < .01$.

As a validity check, our results are consistent with Okun's Law, which predicts that when GDP decreases unemployment decreases (Okun, 1962; Kaufman, 1988). However, interestingly the loadings also predict that liberal cultures are more productive than structurally rigid cultures. In the United States, years ranging from 1947-2012, there was an economic increase of 4.25% in a democratic presidency compared to 2.54% increase in a republican presidency (Plumer, 2014). Given that democrats are traditionally associated with liberalism and less rigidity whereas the opposite holds for the republicans, this supports that data found within this study on liberalism vs. conservatism in relation to economic productivity.

Descriptive Statistics

Table 4 presents the descriptive statistics for the three component variables: rigidity and inefficiency (RI), pragmatism (P), and competitiveness and inequality (CI). Overall, these analyses indicate that three distinct components were underlying the cultural and economic variables. The skewness and kurtosis were within an acceptable range (Fields, 2009). This was prerequisite assumption that must be met to continue analysis using a parametric modeling.

Table 4.
Descriptive statistic for the three cultural-economic components (N=299)

	N	Mean	Std. Deviation	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
Rigidity and Inefficiency (RI)	299	0	1	1.148	0.141	0.57	0.281
Pragmatism (P)	299	0	1	0.575	0.141	-0.3	0.281
Competitiveness and Monopsony (CM)	299	0	1	-0.074	0.141	1.752	0.281

Study 2: Methods & Results

A stepwise multiple regression was conducted to evaluate whether all three components (Rigidity and Inefficiency, Pragmatism and Competitiveness and Inequality) were necessary to predict mating behavior. As the PCA was useful in understanding the holistic perspective of the country both economically and culturally, it did not provide insight into mating behavior. Thus a regression was conducted by using a mating index of marriage plus birth rate to see whether the independent component variables affected mating behavior. At step 1 of the analysis pragmatism entered into the regression equation and was significantly related to the mating index $F(1, 297)=76.634, p<.001$. As

shown, 20.2% of mating behavior can be accounted for by pragmatism ($R^2 = 0.202$). At step 2 of the analysis rigidity and inefficiency entered into the regression equation and was significantly related to the mating index $F(1, 2976) = 60.723, P < .001$. The multiple regression R^2 was .291, indicating that 29.1% of mating behavior can be explained by P and RI in combination. Based on the Durbin-Watson test of autocorrelation, the two components are autocorrelated as it is above .2 (Fields, 2009). Competitiveness and Inequality (CI) did not enter into the equation of the analysis ($t = .458, p > .05$).

Table 5.

This table depicts the contributing variables to the regression model for the mating index.

Model Summary ^c										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
Step 1	0.453 ^a	0.205	0.202	1.92249	0.205	76.634	1	297	0.000	
Step 2	0.539 ^b	0.291	0.286	1.81873	0.086	53.825	1	296	0.000	0.46

a. Predictors: (Constant), Pragmatism

b. Predictors: (Constant), Pragmatism, Competitiveness and Monopsony

c. Dependent Variable: Mating Index

As shown, RI and P enter negatively ($\beta = -.631, p < .000$), and ($\beta = -.975, p < .000$), and CI was excluded from the analysis. This implies that as Rigidity and Inefficiency decrease birth and marriages increase, or as the inverse would describe a relaxed structure that is highly productive increases both marriage and birth rates. Additionally, as pragmatism decreases (becomes normative/ conventional) birth and marriage rates increase.

General Discussion

Evolutionary psychology can be thought of as an approach or a lens through which one can interpret behavior (Brinkman, 2011). In this paper the primary lens was the mating strategies theory, under which there were several competing models for interpreting human behavior in relation to mating. Table 6 shows the relationship each variable has independently and collectively with the mating index, which was a composite score of marriage plus birth rate, due to their positive correlation with each other.

Table 6. Variable Behavior When Mating Index Increases

Component	Variables	Mating Index: Increase
1	Rigidity & Inefficiency	Decrease
	-GDP	Increase
	Unemployment	Decrease
	Power Distance	Decrease
	-Individualism	Increase
	Uncertainty Avoidance	Decrease
	-Indulgent	Increase
2	Pragmatism	Decrease
	Pragmatism	Decrease
3	Competitiveness & Inequality	N/A
	GINI	N/A
	Masculine	N/A

Good Genes and Parental Investment Discussion

The first research question in this section is whether mating strategies vary. The results from this study support that mating strategies do differ based on economic and cultural variables, which would provide support for the good genes hypothesis. The results support the good genes hypothesis because the good genes hypothesis can explain

and expects some mating strategy variation, however this theory cannot be fully supported due to the fact that the good genes hypothesis is biologically driven and cannot explain why these variables may influence behavior, and it can only account for expected variation to occur. Our results do not support the parental investment theory that predicts minimal to no variation due to the strength of biological drives over and against external variables.

The second research question was whether birth rates increased in a normative or non-normative culture. The results from this study indicate that birth rates increase in a normative society, which provides support to the parental investment model. The parental investment model is more aligned with traditional problem solving solutions and focuses on the short term, which tends to increase birth and marriage rates. The data supports this through the pragmatic factor that shows that when cultures have a low pragmatism score (that is normative) marriage and birth increase. The results from this question do not support the good genes hypothesis which emphasizes the desire of both sexes to access high quality genes for their offspring. While this hypothesis inherently limits the amount of potential mates due to the categorical divide of good or bad genes, competition would be a result of the “many” trying to access the “few.” This model would work best in a non-normative setting, however as indicated prior birthrates do not flourish in a non-normative environment.

In sum, both the good genes and parental investment model received partial support. The good genes hypothesis predicted more variation in mating strategy use than parental investment, but could not account for why cultural and economic variables could influence behavior. The parental investment received partial support, as it predicted that

births would increase in a normative culture, which was supported through the pragmatism factor.

Developmental-attachment and Strategic Pluralism Discussion

The third research question was whether monogamy increases or decreases in relation to resource availability. The strategic pluralism model predicts that as economic hardship increases bi-parental investment will be advantageous to increase the chances that the combined offspring will develop. Therefore this model would predict that when GDP decreases there would be an increase in marriage rates. The developmental attachment model predicts the exact opposite. This model suggests that as economic resources decline, parental investment in their offspring will decrease as a response to this due to an increase in energy allotment to gathering resources so children will form insecure attachments to their children. Developmental-attachment theory holds that the parent-child relationship model will persevere through the child's life into adulthood and that if the child initially receives a poor model, i.e. insecure attachment, they will continue to use this model into adulthood which will decrease the likelihood of marriage. Given that marriage and birth rates are correlated and made into one composite score for this analysis, each theory would have opposing prediction for the mating index in relation to GDP, and research question four is consumed by research question three. The results support the developmental attachment theory and not the strategic pluralism model.

While the results support the developmental attachment theory, the demographic transition theory (DT) by Warren Thompson shows that in industrialized nations (which are inclusive of all of the countries used in this study) there is a general decrease in birth rates in comparison to non-industrialized nations. The demographic transition theory has

a four-stage process where the first stage shows a high rate of birth rates and death rates that keeps populations balanced (Chesnais, 1992). This typically is due to low accessibility to resources and health care. Stage two shows a drop in death rates where birth rates stay similar to what is seen in stage one (Chesnais, 1992). Stage two has more access to resources and health care that increases the life span of the population. Stage three shows a decrease in births due to access to contraception and the population becomes balanced again (Chesnais, 1992). The last stage is a further decrease in both birth and death rates, which may dip below replacement level due to population control, etc. which can be seen in Japan and China (Chesnais, 1992). The countries in this present study are all either in stage three or four, which would regulate that all countries are relatively equal in accessibility to contraceptives, but further substantiates the results that even in relatively comparable countries there is still a behavioral difference between access to resources and how that alters marriage and births within a country.

In sum, the developmental-attachment theory was partially supported by the results of this study due to the theory's prediction that marriage rates would decrease in an economic hardship. While support was provided to the developmental attachment theory, this study could not access whether the assumptions of this theory were met, or if there is an alternative explanation that would result in similar predictions. However, it is clear that during economic hardships bi-parental investment is not the typical strategy- thus our results do not support the strategic pluralism model.

Sexual Strategies and Social Structural Discussion

The last research question, question five, looks at whether cultural values influence mating behavior. The sexual strategies theory would predict that due to the

difference in reproductive equipment the biological strength supersedes external factors and cultural values would not or would minimally influence mating behavior. The social structural model would expect only by combining internal and external factors can mating behavior be accurately predicted, thus social values would influence mating behavior. Our results support the social structural theory as multiple cultural values in combination do influence mating behavior. Furthermore, given that the population was purposefully homogenous to check for the effect of resource availability, the fact that there was a cultural influence on behavior provides even more support to the social structural theory.

Additionally, the social structural model assess the historical divide of duties between the sexes which later evolved into gendered norms, where many duties are still divided but not due to biological differences but due to gendered, patriarchal norms (Eagly & Wood, 1999). One such normative practice is pronatalism, which emphasizes the importance of reproduction to the point of stigmatization of individuals who voluntarily choose to not have children (Parcy, 2005). Thus, this model would predict that a more normative and conservative culture would have higher rates of marriages and births compared to a non-normative culture. Our results support that normative cultures do have higher rates of births and marriages.

In support of these findings, in the United State women who have graduated with a bachelor's degree have fewer children than those who do not possess the same education level (Wetzstein, 2011). One of the factors believed to be contributing to this is a delay in how long women are waiting to have children after college by putting their career first. This might be expected in a country that is more open to non-normative

practices by allowing the time and space to open up for women to choose to have children or not. This would not be expected in more conservative cultures, which is pointed out in the social structural theory that emphasizes normative practices. Interestingly, in contrast to the good genes hypothesis, people tend to date others who look like themselves, which would reduce the amount of competition to access the best genes, as others desire people who are within a range of their own attractiveness level (Pierson, 2014).

In sum, the social structural theory was supported by the data from this study and the sexual strategies theory was not. The social structural theory is the only theory that could account for social influence on mating behavior and received full support from our data across 23 westernized cultures. The research questions and results are summarized on Table 7 below. However, given the spectrum and focus on the biological in evolutionary psychology the results from the analysis cannot be fully understood or interpreted with the theories available. Therefore, the next section will discuss the cultural and economic results in more detail.

Table 7. Research Questions and Answers

Research Question	Answer
1 Do mating strategies vary?	Yes
2 Are there more birth in a normative or non-normative culture?	Normative
3 Does monogamy increase or decrease when resources are low?	Decrease
4 Do birth rates increase or decrease when resources are low?	Decrease
5 Do cultural values influence mating behavior?	Yes

Designing a Culture

The results of this study extend beyond the theories analyzed. What does it mean to have all of the cultural and economic variables reduced down to three component

variables? It should also be noted that all of the countries used in this study are within the top 75 countries in the world for economic prosperity with Luxembourg having the lowest economic rank out of the group at position #73 as of 2013 (Worldbank). This shows the relative economic proximity to one another, in comparison to the rest of the world. Additionally, many of the countries share borders with one another, are a part of the European Union and have high trade between countries to support one another. The next sections review the three component variables in more detail.

Component one, *Rigidity and Inefficiency (RI)* decreases as a composite unit in relation to the mating index. The economic factors that contribute to this factor are GDP and unemployment which have an inverse relation to each other, where GDP has a negative, loading meaning that when GDP increases the mating index also increases and when unemployment increases the mating index decreases. Therefore, when accessibility to resources becomes challenging, i.e. low GDP and a high unemployment rate, marriages and births decrease. The cultural variables that comprise component one are power distance, collectivism (-individualism), uncertainty avoidance and restraint (-indulgence). By these four variables clustering together it shows that typically in culturally Westernized countries there are several cultural values that trend together. This means that in Westernized countries cultures are either: rigid in social structure, are comfortable with inequality amongst the members and rely on traditional problem solving strategies, or the culture strives for equality amongst the members, has a loose social structure and is open to new ways of handling future issues. The former cultural description is when this variable receives a high score and is coined, *rigidity*, and the latter is when this variable receives a low score and is coined, *flexible*. The rigid end of

the spectrum has a decrease in birth and marriages whereas the flexible side has higher levels of marriages and births. In combination a high score for the first component would indicate that a culture is rigid and inefficient in production, whereas a low score indicates that the culture is flexible and efficient in production. Thus a rigid and inefficient culture has lower marriage and birth rates with the inverse being that a flexible and productive culture has higher marriage and birth rates.

Component Two, *Pragmatism*, is comprised only of the pragmatic variable from Hofstede's dimensions. However it should be noted that having a high score in pragmatism does not necessarily correlate with general associations of the word pragmatic. While commonly the term is taken to mean that someone is logical with a practical point of view, the use of this term is somewhat different where pragmatic is on the opposing scale of Pragmatism-Normativism which are not necessarily antonyms of each other as may have been intended in the original labeling process. Thus, non-normative is a better descriptor of this category and the term pragmatism should be associated with non-normative, liberalism and openness to learning.

Component three, *Competitiveness and Inequality (CI)*, is comprised of masculine/ feminine and the GINI index. As previously mentioned, the terms masculine and feminine are gendered terms and should not be associated with the sexes. There is no relationship between a high sex ratio, (i.e. more men) and a masculine culture. The masculine/ feminine dimension is better understood in terms of competitiveness and a singular leader, where a high score in competitiveness indicates that the culture seeks a singular winner in a competition compared to a low score where a collective group is congratulated for their contributions in the competition. The GINI index is positive

which represents a high score resulting in a monopsony, or where one person (or few) has the resources and the larger group seeks to access resources from the few. Thus the collection of this component shows a culture that seeks an individual winner who holds the majority of the resources compared to having a collective group effort that divides the resources equally amongst the group. The CI model did not load into the regression so no relationship has been found for this variable and the mating index (marriage and births).

Given the relations between the nine variables that formed composite factors and the two variables forming the mating index several implications emerge. First, if one wants to increase their economic prosperity the cultural profile would be similar to this: highly individualistic, equal power distribution amongst its members, indulgent in relation to human desires and needs as well as being open and flexible to new ideas. Thus, this liberal approach of being open and diminishing social hierarchies produces economic prosperity that also increases marriage and birth rates. As mentioned prior, Luxembourg has the lowest economic rank out of the group, while the USA has the highest ranking in the world (and in our sample). The cultural profile of the USA remarkably resembles the perfect cultural profile of economic prosperity. This makes sense given the fact that it *is* the highest-ranking country in the world and therefore, the cultural profile supports our data and conclusion that cultural make-up do influence economic states.

Further, if it holds that democrats are associated with liberalism and republicans with conservatism, the five most prosperous states in the United States have 3 out of 5 democratic orientations, where the five most economically deprived have 1 out of 5

democratic orientations (States in Profile). Thus the results provide support that liberalism and if conflated with the Democratic Party show that these values provide an equal culture that economically prospers.

The third component, CI, supports that a cooperative culture will have an equal economic state amongst the members, where a highly competitive culture will have only a select few prosper. However, if combined with the information prior, a culture that values liberal ideals and is cooperative with one another, it will have a strong economic state with equal monetary dispersion amongst its members. Thus, if economic prosperity is important, the culture and government should reflect values that allow for openness to new ideas, emphasize individualism and responsibility to the individual, strive for equality amongst its members and allow for individual indulgences rather than restraint.

If a culture is attempting to decrease their population, as resources are becoming stretched across the population, there are a few cultural values to take into consideration. First, it should be noted that the typical trend to decrease population may also decrease resources as a whole based on the results from this data set. However, it can only be generalized to westernized cultures and may not show similar effects elsewhere. The first step would be to decentralize the individual and focus on the collective whole and form rigid social hierarchies. These rigid social boundaries would create less flexibility between individuals and thus form restrictions within the population. Additionally, values and traditions should be held constant, where the motto would be: “don’t reinvent the wheel.” However, there is some room for flexibility in that a non-normative society has fewer marriages and children. Thus, a long-term focus with logical problem solving solutions with a rigid social hierarchy is a blue print for decreasing births within a

society. However, given social rigidity, it naturally provides greater control for the leader of the population.

In sum, the component variables provide basic cultural profiles for increasing resources and increasing or decreasing the population, which are not mutually exclusive. When countries are more equal than not, the country tends to have more resources and more births whereas cultures that are not equal have fewer resources and births.

Limitations and Future Direction

There are several limitations in this analysis that should be discussed. First, in efforts to look for any differences the cultural sample was fairly homogenous, which may explain the collapse of the six cultural dimensions, but more importantly these results cannot be generalized to non-westernized societies and this can only provide a framework for the population as a whole rather than specific subgroups and minorities. Future research should look at different countries as a comparison set to see differences between westernized and non-westernized countries and cultural behavior.

Second, some of the information was limited based on data availability. Public records did not always have data points for a ten year time span for all 23 countries assessed, therefore certain variables such as age of first pregnancy could not be addressed in this analysis. An effort to collect and examine further data points would be a necessary next step in attempting to understand the validity of the theories addressed in this study.

Third, a lot of the theories emphasize differences between monogamy and promiscuity and the data set used only had proximal, objective information and could not

measure monogamous and promiscuous behavior directly. Thus, while marriage is a good measure of projected monogamy, it is not perfect in that extra-marital affairs occur and there was no measure for this in our data set. Future research should include measures of commitment, promiscuity and straying behavior, potentially in STDs contracted within a supposedly committed relationship from one individual straying. Additionally, age of first pregnancy would also be relevant, especially for the Developmental Attachment Theory as that supports younger onset of first pregnancy when resources are low. Additionally, the relationship between promiscuity and parental attachment should be assessed in relation to economic resources. This focus goes beyond the scope of this study, but would be a necessary step to confirm further support for this theory.

Fourth, the sex ratio theory may be a mediating variable for the sexual strategies theory, but due to availability of public data, this could not be assessed at this point. Preliminary sex ratio data is in the appendix of this paper. Further research should look at the sex ratio trends in relation to the questions addressed in this analysis. The sex ratio predicted that violence would increase when there were more men to women within a society. However, the prominence of violence was not addressed in this analysis and future research should include this variable when assessing the sex ratio theory.

Conclusion

In conclusion, several theories were supported by the results of this study. The good genes hypothesis was partially supported due to its wider spectrum allowing for variability in female mating strategic use, however it could not account for how cultural

and economic variables could affect behavior, so could not be fully supported. The parental investment model was partially supported as it predicted that normative cultures would have more marriages and births than non-normative cultures, but was not supported in relation to its limited scope on mating strategy variation. The developmental-attachment theory was supported as it predicted that birth and marriage rates would decrease in economic hardships, whereas the strategic pluralism model was not supported as it predicted the exact opposite. The social structural theory was supported due to its ability to predict that cultural values and other external variables would affect mating behavior, while the sexual strategies was not fully supported given its limited scope on the biological underpinnings of human behavior without being able to explain external variables.

In addition to the theoretical findings, the component variables were informative due to the collective groupings of both cultural and economic variables. The components showed that in westernized cultures, economic wealth is seen in cultures that are cooperative, individualistic, indulgence and open-minded. In these cultures there are also higher rates of marriages and births. Therefore, by valuing open mindedness and cooperation is inherently valuing productivity and efficiency.

Last, the results support that evolutionary psychology cannot fully explain the cultural and economic formations seen within the analysis in this study. Therefore, while biological factors are informative of mating behavior, they are not the only informative components. Emphasis towards attempting to understand external pressures on mating and human behavior are the next necessary steps towards unifying and forming a larger theoretical model that is capable of understanding and predicting human behavior.

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Appendix

Appendix 1. Variable Source List

Variable	Source	Website
GDP	Economy Database	https://www.conference-board.org/data/economydatabase/
Unemployment	Index Mundi	IndexMundi.com
GINI	World Bank	worldbank.org
Sex Ratio	CIA Factbook	https://www.cia.gov/library/publications/the-world-factbook/
Birth Rate	Index Mundi	IndexMundi.com
Marriage Rate	Destatis	destatis.com
Culture	Hofstede	http://geert-hofstede.com/index.php

Appendix 2. Sex Ratio Methods & Results

A correlation was performed for sex ratio and birth rates ($r = -.114$, $p < .05$), a weak but significantly negative correlation that indicates that as the number of women increases so do the amount of births. A second correlation was performed for sex ratio and GDP ($r = .103$, $p < .05$), a weak but significant positive correlation that indicates that as there are more men productivity increases. A third correlation showed that there is no relationship between sex ratio and masculinity. A fourth correlation showed that there is a negative relationship between GDP and masculinity ($r = -.149$, $p < .01$). This indicates that as cultural femininity increases, productivity increases.