The Utility of Relationships: The Utility of Life

A thesis completed in partial fulfillment of the requirements for the degree of:

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By

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May 2017
We recommend that the thesis prepared under our supervision by

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The Utility of Relationships: The Utility of Life

be accepted in partial fulfillment of the requirements for the degree of

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Sheri Faircloth, Ph. D., Thesis Advisor

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Tamara Valentine, Ph. D., Director, Honors Program

May 2017
Abstract

Utility may be an abstract concept but happiness is not. This research was conducted to determine how difficulties in personal finances between couples affect the utility of their relationship, and their aggregate utility of life. The formulas created from the body of presiding research show that these formulas affect one another, and that personal finance within a relationship can affect the overall utility of life experienced by an individual. Three concepts are examined: the utility of life or the usefulness derived from all aggregate factors of an individual's life; the utility of relationship defined as the usefulness an individual experiences from their main lifelong relationship; and the utility of monetary cohesion within a relationship or the usefulness an individual gains from similar financial ideals with their partner. The literary review culminated in the creation of three utility functions interact in a linear fashion with each other, and that financial matters are the most correlated factor with divorce. These findings should be used by the financial services industry to provide more practical information to their customers by helping couples foster congruent perspectives on financial matters, and highlight exactly how detrimental differences in applied personal finances can be for the everyday population.
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Introduction

The millennial generation is known for having extremely different priorities and approaches to traditional social constructs from the generations that preceded them (Ansari, 2015). Examples of this are their tendency to embrace new technologies, interest in previously counter culture ideals, to their approach to happiness. Utility is a standard measure of usefulness from the field of economics and the foundation of the study of economics. It is based upon preference and the scarcity of resources. Utility functions model how to achieve the maximum usefulness from several inputs (De Fraja, 2009). The use of utility terms to follow in this paper should be viewed with this definition. For example, the utility of life will be defined as the aggregate usefulness derived from all areas of an individual’s life. This inquiry will seek to show how to achieve maximum usefulness through relationships and how financial cohesion with partners can affect those same relationships. The monetary cohesion utility function is present within the utility of relationship function, and the utility of relationship function will be present within the utility of life function. These utility equations will fit within each other to show how they impact one another and the effect utility of monetary cohesion and utility of relationship have within the utility of life function.

A book written by Aziz Ansari and Alter, entitled Modern Romance inspired this research into utility functions. The authors researched differences between preceding generations, namely the millennial generation’s parents and grandparents, and the millennial generation within the area of romance. Their research considered a
multicultural, multigenerational sociological study about the nature and pursuit of relationships. Their findings showed that the millennial generation commits to an individual life partner far later in life than the generations that preceded them. This finding highlights the observation that the millennial generation does not have a firm grasp of what will make them happy in life when they select a life partner.

This thesis will research and examine the utility relationships of money, lifelong partner relationships, and life. It will focus on the topic from a magnified perspective, starting first with the utility of monetary cohesion within relationships, then moving into the utility of relationships, and finally, to the aggregate utility of life. This topic is being researched to better understand what attributes make human beings happy, how to maximize that happiness through relationships, and to help identify why the millennial generation is noncommittal relationally until much later in life. The research into this proposed question would contribute to my field of study by highlighting how money and relational interactions with finances interact with relational utility. The financial industry thrives on creating financial products to meet needs, and then selling those products. This research will help identify what products would be most beneficial to customer overall relational utility, and thus their utility of life.

Introduction to Terms

I will answer the question of how difficulties in personal finances between couples affect the utility of their relationship, and their aggregate utility of life through
review of the presiding body of research, and further research into the utility of money within relationships the utility of relationships, and the overall utility of life. This research will be harnessed to create a utility function to describe what makes a relationship fulfilling and positive. I will then apply the utility of relationship function to the overall utility of life at a theoretical level to highlight its importance on aggregate utility. This research will afford a better understanding of actions and of the troubled romantic mishaps of the millennial generation, and what all individuals can target to find relationships that provide them as much satisfaction as possible.

Utility of life is a term that is currently used within fields relating to biology in the form of the term utility of the fish and ready meal life cycle. The term is used with regards to inquiries as to how to best manage a resource, such as fisheries. In an article by Vazquez-Rose and Benetto (2014), the term utility of life cycle is used in their analysis of fisheries. Their paper uses the term to describe the amount of usefulness derived from fisheries. The term utility of life cycle has also been used to describe recycling. Calderon et al, (2010) uses the term utility of life cycle to discuss the best practices for recycling prepackaged meals. The term utility of life can also be found in journals for the discipline of economics. Veenhoven (2000) describes utility of life as an “umbrella term” to describe the transcendental and other qualities of life that provide usefulness derived from an individual’s life. For this thesis project, the term utility of life will be used in an economic rather than biological sense. Utility of life will refer to the aggregate utility of a human life, or the usefulness derived from all areas of an individual’s life.

Darwinkel, Powell, and Tidmarsh (2014) use the term utility of relationship in a criminology article. The term is used in their article to describe the quality and usefulness
of relationship evidence in prosecuting a criminal case. This term is not widely used in financial research and will be used differently for this paper. The utility of relationship is a term for the utility of a lifelong relationship for the remainder of this thesis.

The term utility of monetary cohesion was not located in the existing body of academic research. The term utility of monetary cohesion refers to the utility or usefulness derived from views on monetary issues such as budgeting and spending within the bounds of a lifelong partnership. These financial views and how they interact with usefulness gained from other areas of life will be the focus of this research.
Introduction

The literature review will be organized in an ascending manner. The utility functions will be nested within each other on an ascending level. The first utility function discussed will be the utility of monetary cohesion within a relationship. Then the utility of relationship will be discussed (with the formula for monetary cohesion being represented within it.) Lastly, the utility of life will be analyzed, with the utility of relationship being represented within its function. The figure below illustrates the interaction between the utility functions that will be developed from the review of literature.

Figure 1: Organization of Utility Functions
Utility of Monetary Cohesion Within A Relationship

Money is of paramount importance to the human experience. Currency represents the ability to thrive, ability to recreate, and therefore is one of the most treasured possessions. A study by Coelho and Ferreira-Valente (2016) found that when individuals become married, they overwhelmingly bring their money together and create a joint account. In short, they share their financial resources. This leads to increased conflict as two individuals reconcile differing views as they share a new joint resource. Research by Olcon-Kubika (2016) argues that money is inherently moral in nature; meaning that emotions are attached to it and it is viewed as more than just a resource. Individuals attach emotion and motive to financial decisions, even within the normal monetary transactions that couples would make on a weekly basis. This extends from the monetary rules that both individuals understand, to the specific practices that are positively or negatively looked upon. Therefore, the monetary resource that is now being shared is not simply viewed as a numerical decision point, it is viewed as a moral and emotional subject by couples. Money is also viewed, in the United States and Germany by couples as their contribution to the relationship (Ludwig-Mayerhofer et al., 2011). This finding foreshadows the inflammatory quality that money can have within relationships. A study by Dew (2011) found that although financial issues or disagreements did not predict the likelihood of marriage, that both financial disagreements and perceived unfairness in
finances are predictive factors of union dissolution. In Dew’s own words he stated “These findings suggest that the relationship problems associated with financial issues are particularly salient to cohabitating individuals decisions to end their unions.” This body of research highlights the potential difficulties posed by the cohesion of monetary views within a relationship. Money is often shared even though it is a valuable resource that carries concerns over morality. Individuals also can view the money brought in by their spouses as their contribution to the relationship. These differing views of monetary views can be a breeding ground for disagreements and discontent if a large income disparity gap exists between the couple. Additionally, financial motivations are a large predictor of partnership dissolution, although they cannot be used to predict the creation of a couple according to the study by Dew (2011).

Utility of Relationship

When individuals attempt to form a lifelong relationship, there are specific values that the majority of individuals have in mind according to Fletcher, et al. (1999). Their multi-stage study found that three prominent factors represent the ideal partner: trustworthiness, attractiveness, and resources. They additionally found that the ideal relationship, regardless of partner was represented by two main factors: loyalty and passion. This study highlights the three factors that make an individual partner most desirable and the two factors that define the most attractive relationship. To restate, the study identified two factors that individuals use to describe an ideal relationship, and three separate characteristics that individuals used to describe their ideal partner. It was
additionally found that although individuals select partners with appealing qualities and these qualities clearly predict romantic success in initial attraction settings, or settings where individuals first meet, some individuals depart from the traditional selection process (Eastwick and Hunt, 2014). Another piece of research by Eastwick, et al. (2014) supported the fact that attractiveness was far more predictive than income in the traditional initial attraction settings. Additionally, Killewald (2016) found that long-term male unemployment was associated with a higher risk of divorce. This body of work highlights interdependence theory, a theory that states that individuals compare their current situation to a neutral standard. This theory states that individuals in a relationship compare their own relationships to a ubiquitous or non-specific comparison point. Combining these findings with the findings from the utility of monetary cohesion, we can clearly see that although money is not a factor that heavily affects the chances of a relationship beginning, it is the main reason for the termination of relationships. There are clearly identifiable factors that individuals look for when selecting a partner or initiating a new relationship, with many focusing upon attractive features. However, not all couples follow this selection procedure, meaning that there is a significant variance in partner selection that remains unaccounted for with the current models.

Utility of Life

The utility of life is highly theoretical and extremely subjective. It is possible to find accurate measures for adjacent intellectual ideas, such as the “good of life”, which can then be used to better identify the utility of life. Veenhoven (2000) utilized a four-
part matrix to attempt to find if quality of life can be measured comprehensively. The conclusion was that there is not a way to measure quality of life comprehensively. The best measure of quality of life is still how long an individual lives and how happy they are during that time. In other words, no one can determine quality of life better than the individual. A matrix was created with major qualities of life being used to measure the overall quality of life. The four qualities of life that were included in the matrix are: livability of environment, life ability of the individual, external utility of life, and inner appreciation of life. These four categories will be utilized in the creation of the utility of life function. Haybron (2001) identified that happiness is central to an individual’s well being, although it is not sufficient in and of itself to provide well-being unilaterally to an individual. Additionally, happiness was identified as an individuals overall mood state (Haybron 2001). Due to this evidence, a survey of simple happiness will not be sufficient to identify the utility of life. Although happiness is a good measure for the quality of life, happiness can be impacted by many factors other than just quality of life. Mood disorders, psychological issues, or physiological problems can change how happiness is perceived. Although perceived happiness is important to quality of life, it cannot be the sole explanatory factor. Shmanske (1997) used utility functions for happiness to illustrate a discounted utility models effect on happiness (a discounted utility model takes into account the time) Using this specific discounted utility model it was found that happiness grows as an individual approaches high consumption years early in life and then decreases toward the end of the individual’s life as consumption diminishes. This is a major concept in aggregate utility of life if it is examined on a lifetime basis. Three main factors for yearly happiness were identified: consumption, leisure, and memories.
Additionally, Blanchflower and Oswald (2011) stated that there would be an intellectual convergence from various fields onto happiness as new metrics of performance as opposed to the standing measures of performance. For example, studies already exist in this area and seem to disagree with the traditional GDP valuation of a nation. Blanchflower and Oswald (2011) additionally state that this convergence will occur because the lines between happiness and mental health are becoming increasingly vague, and this will instigate the medical community to begin studying happiness. Also Blanchflower and Oswald (2011) state that happiness is usually determined as a function of many factors, however the regressions from these functions do not provide adequate R-squared values to be considered predictive.
Utility Functions

Introduction

The utility functions that follow were derived from the sources discussed within the literature review. The variables will eventually be filled by survey data or by the individual using the functions.

For reference, Table 1 below shows the variables used in the following equations and their definitions of the variables utilized in the utility equations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV</td>
<td>Congruent Viewpoint on Financial Matters</td>
<td>Scale of 1-10, 10 representing the most congruent viewpoints</td>
</tr>
<tr>
<td>FD</td>
<td>Fairness in Financial Decisions</td>
<td>Scale of 1-10, ten representing extremely fairness in financial decisions</td>
</tr>
<tr>
<td>D</td>
<td>Frequency of disagreements</td>
<td>Disagreements on financial matters per month.</td>
</tr>
<tr>
<td>ID</td>
<td>Income Discrepancy</td>
<td>Reported income discrepancy between partners per year in thousands of dollars.</td>
</tr>
<tr>
<td>PA</td>
<td>Partner Attractiveness</td>
<td>Reported partner attractiveness of current partner. Scale of 1-10, with ten representing an extremely attractive partner.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>RA</td>
<td>Relationship Attractiveness</td>
<td>Reported relationship attractiveness of current</td>
</tr>
<tr>
<td>RF</td>
<td>Risk Factors</td>
<td>Reported risk factors of current relationship. Scale of 1-10, with 10 representing an extreme presence of risk factors.</td>
</tr>
<tr>
<td>CP</td>
<td>Comparison Partner Attractiveness</td>
<td>Reported attractiveness of comparison partner and</td>
</tr>
<tr>
<td>RFp</td>
<td>Perceived Risk Factors</td>
<td>Reported risk factor of comparison relationship. Scale of 1-10</td>
</tr>
<tr>
<td>MH</td>
<td>Mental Health</td>
<td>Days per month where mental health was prohibitive.</td>
</tr>
<tr>
<td>E</td>
<td>Environment</td>
<td>Comfort of the environment. Scale of 1-10, with ten representing an extremely comfortable environment.</td>
</tr>
<tr>
<td>C</td>
<td>Consumption</td>
<td>Consumption per day in United States Dollars.</td>
</tr>
<tr>
<td>L</td>
<td>Leisure</td>
<td>Leisure days per month.</td>
</tr>
<tr>
<td>H</td>
<td>Perceived Happiness</td>
<td>Self reported happiness. Scale 1-10, with ten represents extremely high perceived happiness.</td>
</tr>
</tbody>
</table>

Utility of Monetary Cohesion Within Relationship
In order to synthesize this utility function the highlighted information from the literature review for utility of monetary cohesion within relationship will be drawn upon and represented mathematically. In the study conducted by Dew (2011), the fairness of financial of financial decisions was twice as predictive as the congruent viewpoint variable. Congruent viewpoints on financial matters and fairness within financial decisions both positively effect the utility of monetary cohesion within relationships, while income discrepancy and the frequency of disagreements detract from the utility of monetary cohesion within relationship. The utility formula constructed will incorporate the scaling effect of having conflicts within the relationship. The Utility of Monetary Cohesion formula is given by:

\[ U(MC) = CV + 2FD - \left[ \frac{D}{(CV + 2FD)} \right] - \frac{ID}{360} \]

- \(CV = \) Congruent Viewpoint, with a positive number representing similar viewpoints
- \(FD = \) Fairness of Financial Decisions, with a positive number representing fair decisions.
- \(D = \) Frequency of Disagreements, with the variable representing disagreements per month.
- \(ID = \) Income Discrepancy, with zero representing identical incomes and any yearly discrepancy being represented by a positive number.

The variables for congruent viewpoint (CV) and fairness of financial decisions (FD) are the cornerstone of this formula. The variable for fairness of financial decisions is multiplied by two to represent the R-value that was found to be twice as high as the R-
value for congruent viewpoint on financial matters in the study by Dew (2011). The next portion of the formula takes into account the frequency of disagreements over financial matters on a weekly basis. The frequency of disagreements is used to divide the constant of thirty. This allows the equation to give higher overall values to couples that fight less, with the lowest positive available value being 1. This number is then multiplied by congruent viewpoints and fairness in decisions divided by seven, to maintain the monthly element of this portion of the equation. It is important to note that a positive total for congruent viewpoints and fairness in decisions will yield a positive value even if fights are occurring. If couples are aligned on viewpoints over financial matters and feel that financial decisions are fair, their conflict will not have the same effect on the relationship as the conflict from two individuals who are not aligned on their financial views. Lastly, income discrepancy divided by twelve is subtracted from the total equation. This is due to the research by Ludwig-Mayerhofer et al. (2011), which states that individuals view money as each individual’s contribution to the relationship. This number is divided by twelve to account for the monthly nature of household financial decisions. An unchanged yearly measure would additionally overweight the formula. The final formula reflects the potential positive of conflict, while allowing the certain negative effects of poorly handled conflict over financial matters to still be present within the equation. The discrepancy of income is also taken into account by subtracting total utility from the cohesion of viewpoints on finances and the fairness in decisions made regarding financial matters. To avoid error, all values will be provided by a survey.
Utility of Relationship

The sources reviewed clearly showed identifiable factors that are perceived as optimal by individuals when selecting a partner or initiating a relationship. Additionally, it was identified that partners were also compared to a ubiquitous standard that represents the perfect faceless and imagined scenario for the judging partner (Killewald 2016). When synthesizing this data, it is important to note that risk factors, or unbecoming behaviors of the partner are real and identifiable. They may even be overstated in times of conflict. In contrast, the perceived risk behavior of the comparison partner will be minimal in comparison. This occurs because the perceived risk factors are not a reality for the judging partner. They have not been personally experienced and therefore will logically be given less weight than the very real risk factors of the current partner. The utility of relationship formula is:

\[ U(R) = \frac{PA+RA}{RF} + \left( \frac{PA+RA}{RF} - \frac{CP}{RFp} \right) + U(MC) \]

PA = Partner Attractiveness
RA = Relationship Attractiveness
RF = Risk Factors
CP = Comparison Partner Attractiveness
RFp = Perceived Risk Factors
U(mc) = Utility of Monetary Cohesion Within Relationship
The values for PA, RA, and CP are based upon the factors identified by Fletcher et al., (2016). The formula then shows these attractive qualities as a ratio to the partner’s risk factors. These are variables that are designed to be subjective as an exhaustive list of every factor that might negatively affect a relationship is not within the scope of this thesis. This category will be filled with a value on a scale of one to ten based upon how much risk the partner brings to the relationship. These risk factors could take many forms such as: not being faithful to the relationship, poor communication skills, or waning interest in the partner. The formula then compares the created ratio for the current partner to the ratio of the comparison partner. We know that this comparison naturally takes place due to the work by Killewald (2016). This equation also depends heavily upon rational choice theory. Rational choice theory states that all individual are rational actors who can assign values to all situations, and then choose the highest value (Sugden, 1991.) This theory has come under great criticism, but is still a presiding assumption in economics, and will be a key assumption for this equation. The comparison portion of the formula will detract from the overall utility if the comparison partner is believed to have a more attractive outlook than the current partner. This number is then subtracted from the current relationship. Finally, the utility of monetary cohesion within a relationship is then added to the equation. This highlights the ability of issues with monetary cohesion within a relationship to predict failure of relationships. This utility function is not designed to be predictive of relational prospects, but rather to evaluate current relationships.
Utility of Life

This function is meant to be highly theoretical, as the standing body of research is not satisfied with the current functions, and an in-depth statistical study is beyond the scope and focus of this thesis. From the review of standing literature it is clear that traditional functions to describe quality of life or utility are not deemed effective by the body of experts. Veenhoven (2000) identified a four-part quality of life matrix: livability of environment, life ability, external utility of life, and inner appreciation of life. Also stated was that “The most inclusive measure is still how long and happily people live.” Happiness is also very subjective and can be roughly equated to an individual’s overall mood state and is central to an individual’s well being (Haybron, 2001). The equation will not take into account the quadratic nature of happiness through the use of a discounted utility model (Shmanske, 1997), due to the fact that the formula will be a single point in time, not for the lifespan of an individual. The three factors used in the study of lifetime utility: consumption, leisure, and memories, will be utilized within the function. Utility of Life Function:

\[ U(L) = \frac{(30-MH/30)x(E+C+U(R)+L+H)}{30} \]

MH = Mental Health, days per month mental health was prohibitive

E = Environment, positive scale showing the comfort of the environment, with a scale ranging from one to ten

C = Consumption, per day in dollars
L = Leisure, number of leisure days per month

H = Perceived Happiness, one being the lowest value, ten being the highest value

This utility function describes the studies and information discussed in the literature review mathematically. As discussed, the distinction between mental health and happiness is becoming increasingly blurred (Blanchflower and Oswald 2011). This is reflected in the multiplier at the beginning of the equation. By describing the days an individual's mental health is prohibitive, the variable is used as a constricting factor on total utility. Note that the variable represents the number of days per month that mental health was prohibitive, and not if mental illness is present. Prohibitive mental health describes the number of days that an individual could not gain utility from the positive elements around them due to their mental state. The remainder of the equation focuses upon a summation of the factors represented by Veenhoven (2014) and Shmanske (1997). The variables of environment and happiness are taken on a scale of one to ten to allow for the variables to remain balanced. To help with balancing, the consumption variable represents thousands of dollars consumed per month, assuming United States dollar as the denomination. The prior utility of relationship function is present, as relationships are a factor of total life utility. The leisure variable simply represents total leisure days experienced in a month. This equation includes the main variables used by Veenhoven (2014) and Shmanske (1997), and is theoretical and not a predictive model.
Results

Review of Formula

The results of the study are illustrated in the utility functions that were synthesized and how they interact with each other. The utility of monetary cohesion is the base formula.

\[ U(MC) = CV+2FD-[D/(CV+2FD)]-\text{ID}/360 \]

This formula captures the measure of utility that is gained by having cohesive views of monetary issues within a relationship. The variables: congruent viewpoint, fairness in financial decisions, disagreements over financial matters, and income discrepancy. Income discrepancy will negatively effect the total utility while disagreements over financial matters will only negatively effect the utility if the sum of the congruent viewpoint and fairness in financial decisions variables is negative.

This utility function is added into the next stage utility function, the utility of relationship. Therefore, the utility of monetary cohesion will account for a large portion of the total utility of relationship function.

The utility of relationship function is the second formula in our analysis. This function takes into account partner attractiveness, risk factors of a relationship, comparison partner attractiveness, perceived risk factors, and the utility of monetary cohesion.
U(R) = (PA+RA)/RF + ((PA+RA/RF)-CP/RFp)) + U(MC)

This equation will be equal weighted with the other variables when it is added into the equation for utility of life. With all variables in the next equation being multiplied by the same factor, we can state that the utility of relationship will account for twenty percent of the overall total utility derived from the utility of life function.

The final formula for utility of life is meant to be extremely theoretical in order to keep the formula from being interpreted as predictive at this early stage of research. This formula consists of six variables: mental health, environment, consumption, leisure, happiness, and utility of relationship.

U(L) = (30-MH/30)x(E+C+U(R)+L+H)

The formula is created to limit the total utility derived from resources by the number of days per month that the individual can mentally present enough to consume the positive factors around them. This occurs in the formula due to the continually growing union of mental health and happiness.

Application of Formula
In order to test the utility equations that were created based on the review of literature, two cases will be analyzed using the equations. These cases will be the hypothetical best and worse case scenarios allowed by the variables within the equations. For example, if a variable has a scale of one to ten, one case will represent the lowest value (a one) and the other case will represent the highest value of ten. These cases are in no way based upon any data, personal experience, or real life examples. They are completely hypothetical and are designed to test the validity of the created equations, and a hypothetical range of values that could be output by the equations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Measurement</th>
<th>Worst Case Value</th>
<th>Best Case Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV</td>
<td>Congruent Viewpoint on Financial Matters</td>
<td>Scale of 1-10, representing the most congruent viewpoints</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>FD</td>
<td>Fairness in Financial Decisions</td>
<td>Scale of 1-10, representing extremely fairness in financial decisions</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>D</td>
<td>Frequency of disagreements on financial matters per month.</td>
<td>30</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>Income Discrepancy</td>
<td>Reported income discrepancy between</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>
partners per year in thousands of dollars

<table>
<thead>
<tr>
<th>PA</th>
<th>Partner</th>
<th>Reported partner attractiveness of current partner. Scale of 1-10, with 10 representing an extremely attractive partner.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>Relationship</td>
<td>Reported relationship attractiveness of current relationship. Scale of 1-10, with 10 representing an extremely attractive relationship.</td>
</tr>
<tr>
<td>RF</td>
<td>Risk Factors</td>
<td>Reported risk factors of current relationship. Scale of 1-10, with 10 representing an extreme presence of risk factors.</td>
</tr>
<tr>
<td>CP</td>
<td>Comparison</td>
<td>Reported attractiveness of comparison partner and relationship. Scale of 1-10, with 10 representing an extremely attractive relationship.</td>
</tr>
</tbody>
</table>
extremely attractive comparison partner and relationship.

<table>
<thead>
<tr>
<th>RFp</th>
<th>Perceived Risk Factors</th>
<th>Reported risk factor of comparison relationship.</th>
<th>1</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH</td>
<td>Mental Health</td>
<td>Days per month where mental health was prohibitive.</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>Environment</td>
<td>Comfort of the environment.</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>Consumption</td>
<td>Consumption per day in United States Dollars.</td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td>L</td>
<td>Leisure</td>
<td>Leisure days per month.</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>H</td>
<td>Perceived Happiness</td>
<td>Self reported happiness.</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Worst-Case Scenario
In this scenario all selected values input were selected to output the minimum output value. Each equation will be shown with the variables, then with the numbers selected to fill those variables.

\[ U(MC) = CV + 2FD - \frac{D}{(CV + 2FD)} - \frac{ID}{360} \]
\[ U(MC) = 1 + 2(1) - \frac{30}{1 + 2} - \frac{100}{360} \]
\[ U(MC) = 3 - \frac{30}{3} - \frac{100}{360} \]
\[ U(MC) = -7.2778 \]

\[ U(R) = \frac{(PA + RA)}{RF} + \left( \frac{(PA + RA)}{RF} \right) - \frac{CP}{RF} \right) + U(MC) \]
\[ U(R) = \frac{(1 + 1)}{10} + \left( \frac{(1 + 1)}{10} \right) - \frac{10}{1} \]
\[ U(R) = 2/10 + (2/10 - 10) - 7.2778 \]
\[ U(R) = -16.8778 \]

\[ U(L) = (30 - MH/30) \times (E + C + U(R) + L + H) \]
\[ U(L) = (30 - 30/30 \times (1 + 0 - 16.8778 + 0 + 1) \]
\[ U(L) = 0 \]

Best-Case Scenario
The best-case scenario is a hypothetical maximum for the equations based on contrived values. Some values could potentially be higher, such as daily consumption, so numbers at random were selected to avoid an infinity upper bound being expressed.

\[
U(MC) = CV+2FD-[D/(CV+2FD)]-ID/360
\]
\[
U(MC) = 10+2(10)-[0/(10+2(10))]-0/360
\]
\[
U(MC) = 30
\]

\[
U(R) = (PA+RA)/RF + ((PA+RA/RF)-CP/RFp)) + U(MC)
\]
\[
U(R) = (10+10)/1 + ((10+10/1)-1/10)) + 30
\]
\[
U(R) = 20 + (20 - 0.1) + 30
\]
\[
U(R) = 69.9
\]

\[
U(L) = (30-MH/30)x(E+C+U(R)+L+H)
\]
\[
U(L) = (30-0/30)x(10+500+69.9+15+10)
\]
\[
U(L) = 1x604.9
\]
\[
U(L) = 604.9
\]
Comparison of Values

Based on the two scenarios run through the three utility equations, it is now possible to state the absolute minimum for the equations of -7.2778 for the utility of monetary cohesion, -16.8778 for the utility of relationship, and 0 for the utility of life. This is the absolute lower bound for these equations. The outcome of the best-case scenario was not the absolute maximum for the utility of life equation, as daily consumption is a theoretically unbound variable, meaning that it could theoretically be infinity. However, this case represented an absolute maximum for the equations for utility of monetary cohesion and the utility of relationship. The values output were: 30 for the utility of monetary cohesion, 69.9 for the utility of relationship, and 604.9 for the utility of life.

These two cases indicate that the effectiveness of the equations due to the fact that the worst-case scenario created lower values for all equations than the best-case scenario. The results validate the equations while highlighting the future need for survey data to help refine the weights assigned to the variables in each equation.
Conclusions

This review of research attempts to determine how difficulties in personal finances among couples affect the utility of their relationship, and their aggregate utility of life in numerical terms. It was found that the equations created based on the reviewed literature did in fact interact with one another. It was also found that these equations affected each other in major ways. It should be noted that these equations are not meant to be predictive, simply descriptive. One approach to extend this study is to run statistical analysis on survey data to test the validity and effectiveness of these equations. These equations should be used as a critical starting point for the general public and researchers. They also should be used to consider the importance of personal finance within relationships and life. These equations illustrate how difficulties in one area of personal finance, namely cohesive monetary views with an individual’s relational partner, can change the total benefit that can be realized from an individual’s life. This study did not completely show how financial difficulties could affect total utility, as that was not its focus but it clearly shows a relationship between the two. These equations will change as the body of research continues to grow, and should be consequently repeatedly tested as new research becomes available.

According to this research, financial products that are marketed to couples should be focused on creating a relational aspect within finance, by viewing the consumers of financial products as a person not simply an account number. There should be more focus on fostering consistent financial views throughout the union, as well as giving sound financial and banking advice. Accounts need to be viewed as more than just a number by
those in the financial industry. Providers should be helping their customers create and maintain similar and sound thoughts on finances. Couples or those hoping to enter into a relationship should be aware of the importance of having similar financial views as their partner or potential partner due not only to the disastrous impact in this area, but also the effect those issues can have on their total utility of life.

In the future these equations should be thoroughly tested by survey data. This survey would allow real life cases to be inserted into the equation as well providing a better idea on what survey participants feel the weight of these variables are in their own life. By continuing onto the next step of surveying these equations, the equations would then be able to be applied to individuals in relationship, and individuals who have dissolved their union in another survey. This survey would be used to show the predictive nature of the equations. The equations could be used in a predictive manner due to the first survey, where the weights and interactions of the variables were evaluated.

After the second survey was completed, statistical analysis would be completed upon the data collected, showing how useful the equations are in predicting long term relational happiness and the dissolution of long term relationships.

The equations could then be dispersed into the general community. This would include family and marriage therapists, the financial industry, and to individuals interested in or currently participating in a long term relationship. This would allow tangible change to flow from this research. It would equip mental health professionals to better care for their clientele by providing them with a better understanding of the importance of monetary views within a relationship. The equations could then show financial institutions how to calculate the difficulties faced by couples regarding personal
finances within a long-term relationship. Additionally and most impactful, these equations could be used to educate the general public of the importance of personal finances. The equations could be used for public service announcements, to encourage closer collaboration between couples and financial services professionals and possibly even as a predictive algorithm in online matchmaking services.
Bibliography


Killewald, A. (2016). Money, work, and marital stability: Assessing change in the


Appendices

Appendix 1: Tables

Table 1

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<thead>
<tr>
<th>Variable</th>
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