MINI PROJECT

Arranged Marriage vs. Love Marriage

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Using Decision analysis to answer an age old question in the life of an Indian woman: Arranged Marriage vs. Love Marriage.

Even in the 21st century, Indian women are still faced with the dilemma of an arranged or a love marriage. There is still a considerable amount of social stigma attached to a love marriage and is not readily accepted. My 23yr old roommate from India had to face this dilemma recently when her parents asked her to get married to a boy they've chosen. There started an unending debate of which marriage is better. My roommate was supporting love marriage and was asking for a chance to find love herself and her parents were arguing that arranged marriage is the only way to go. Since there is no way to win with words, I decided to use multiattribute decision analysis to come to a conclusion.

First, we made a list of attributes which we think are taken into consideration while making a decision to marry. We were able to narrow it down to 6 key attributes that we used in the analysis. The attributes were

1. Love and Compatibility- COM
2. Good Looks - GL
3. Financial Stability and Family support – FS
4. Educational Qualification - EQ
5. Horoscope - HOR
6. Same Customs, Religion etc. - REL

Bear in mind that in India, a marriage is not just between two individuals but between two families and the society. Hence you see attributes like Customs, Educational Qualification and Horoscope. Each family gets a reading of the bride and the groom's horoscope or 'Kundali' to see if they match and if they are compatible. This is usually considered to be of utmost importance in most orthodox marriages.

Secondly, In order to determine the utility function for each attribute we conducted a formal utility interview with the bride to be. We asked her to rate on a scale of 0-10 which we used to measure each attribute. We then determined the equivalence point for each attribute using the utility function assessment. We came up with the following equivalence points:

Attribute	Equivalence Points
COM	8.5
GL	8.0
FS	7.0
EQ	6.5
HOR	5.0
REL	5.5

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Utility Functions & Attributes

There corresponding Utility functions are as follows:

COM:	$UX_1 = 0.058 X1	IF 0 ≤ X1 ≤ 8.5
	$UX_1 = 0.36 (X1-10) + 1	IF 8.5 ≤ X1 ≤ 10
GL:	$UX_2= 0.0625 X2	IF 0 ≤ X2 ≤ 8.0
	$UX_2= 0.25 (X2-10) + 1	IF 8.0 ≤ X2 ≤ 10
IN:	$UX_3=0.071 X3	IF 0 ≤ X2 ≤ 7.0
	$UX_3= 0.143 (X3-10) + 1	IF 7.0 ≤ X3 ≤ 10
DQ:	$UX_4= 0.077 X4	IF 0 ≤ X4 ≤ 4.5
	$UX_4= 0.143 (X4-10) + 1	IF 4.5 ≤ X4 ≤ 10
HOR:	$UX_5= 0.1 X5	IF 0 ≤ X5 ≤ 10
REL:	$UX_6= 0.09 X6	IF 0 ≤ X6 ≤ 5.5
	$UX_6= 0.3(X6-10) + 1	IF 5.5 ≤ X6 ≤ 10

We then proceeded to ask the bride to be to rate each attribute according to its importance to her and associated attribute tradeoff scaling constant to each attribute.

Attributes	Weight	X
COM	1	0.8

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GL	2	0.65
FS	2	0.65
EQ	3	0.40
HOR	5	0.20
REL	4	0.25

We then calculated the master scaling constant using Newton's Method, since sum (k) = 2.95 which is greater than 1, and it has 6 attributes. Using Mathematica to expand the functions we arrived at the following equations.

$$f(k)= 1.95\,k+3.4775\,k^2+2.08413\,k^3+0.665675\,k^4+0.10699\,k^5+0.00676\,k^6$$

$$f'(k)= 1.95+6.955k+6.25239k^2 + 2.6627\,k^3 + 0.53495\,k^4 + 0.04056\,k^5$$

After 5 Iterations, the value of K was obtained:

	fx	f'x	x(n+1)
0			-1
1	0.009725	-0.92092	-0.9894399
2	-2.778E-05	-0.9154035	-0.9894703
3	1.605E-07	-0.9154197	**-0.9894701**
4	-9.258E-10	-0.9154196	**-0.9894701**
5	5.3409E-12	-0.9154196	**-0.9894701**
6	-3.15E-14	-0.9154196	

K= -0.98947

We then used the multiplicative method to find the best alternative and the equation for Utility was obtained as

U(Alternative) = 1/K*((1 + ((K)*0.8*U(COM))) *(1 + ((K)*0.65*U(GL))) *(1 + ((K)*0.65*U(FS))) *(1 + ((K)*0.4*U(EQ))) *(1 + ((K)*0.2*U(HOR))) *(1 + ((K)*0.25*U(REL))) – 1

We then conducted a series of interviews with individuals who had an arranged marriage and individuals who had a love marriage over two generations. The first generation being our respective parents and grandparents and the second generation being our cousins and friends. We asked them to give a rating between 0-10 about what they got from their marriage, be it arranged or love. We are going to use these values obtained from experienced individuals to find the best

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alternative. Obviously the values varied widely from generation to generation and they are tabulated as below:

Observations:

	COM	GL	FS	EQ	HOR	REL
Arranged Marriage	4-3	3-5	6-10	7-9	6-7	8-10
Love Marriage	5-7	7-10	1-2	5-6	9-10	8-10

We used the above data to come up with a distribution for each attribute for an Arranged Marriage and a Love Marriage. Before performing Monte Carlo simulation (200 values) we calculated the CDFs for each attribute to arrive at the following equations

Arranged Marriage:

F (COM) = rt+4

F (GL) = 2*rt +3

F (FS) = 4*rt + 6

F (EQ) = 2*rt + 7

F (HOR) = rt + 6

F (REL) = 2* rt + 8

Love Marriage:

F (COM) = rt + 9

F (GL) = 2*rt + 8

F (FS) = 2* rt + 5

F (EQ) = 3* rt + 7

F (HOR) = rt + 1

F (REL) = rt + 5

Where rt is the random number generated.

From the Simulation the following standard deviations and mean are obtained for Arranged Marriage:

	COM	GL	FS	EQ	HOR	REL	Utility
Mean	0.6989337	0.7063105	0.6455187	0.8893973	0.2609749	0.2448776	0.8283149
Std Dev	0.1839859	0.0819862	0.0277036	0.0669931	0.0172345	0.0351939	0.0409101

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And for Love Marriage:

	COM	GL	FS	EQ	HOR	REL	Utility
Mean	0.4230089	0.7770761	0.14691	0.4802804	0.8393596	0.7404178	0.9342942
Std Dev	0.0403314	0.1262459	0.0287583	0.0185903	0.0984052	0.1476089	0.0222843

Thus an Arranged Marriage has a multi-attribute utility of 0.828 ± 0.0409, while Love Marriage has a multi-attribute utility of 0.9342 ± 0.022. Clearly Love Marriage has a higher utility than Arranged Marriage showing its better to wait and find love rather than be pushed into an Arranged Marriage by her parents. Here's to us hoping this analysis changes my roommate's parents' mind and help her find her love.

References:

The data provided in this project was a result of a series of personal interviews of individuals who have had an arranged marriage and love marriage over two generations. This data was tabulated as mentioned and was used for further analysis.

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