

# Measurements of Decision Making Power

## Abstract

This paper measures the new model of decision making power. The model comprises 166 items of on its devised inventory which are explored through factor analyses. The Kaiser-Meyer-Olkin measures of sampling Adequacy Test favours the applicability of inventory. The item wise correlation matrix of 166 items of inventory reveals highly significant positive correlation on almost all the items of inventory.

**Keywords:** Decision Making Power, Self Identity Decisions.

## Introduction

Decision making is a process of selection or choice among alternative courses of action. The need for decision making arises only when more than one alternative exists for doing the work (Kuldeep, 2012). When making decisions, physiological signals (or 'somatic markers') and their evoked emotion are consciously or unconsciously associated with their past outcomes and bias decision-making towards certain behaviours while avoiding others (Damasio, 1994). Immediate emotions can be very sensitive to how vivid the possible outcome is to the decision-maker. Experienced emotions can very powerfully impact decision-making (Keltner and Lerner, 2010). Moreover, the Somatic Marker Hypothesis (SMH), formulated by Antonio Damasio, proposes a mechanism by which emotional processes can guide (or bias) behaviour, particularly decision-making (Damasio et. al. 1991 and Damasio, 1994). Emotions, as defined by Damasio, are changes in both body and brain states in response to different stimuli (Damasio, 1994). The presence of factors in making a choice creates a huge impact on the kind of decision the person will arrive at. The outcome of decisions are also brought about by the factors that played a huge role in the decision making process. Exforsys (2011) observed following factors which affect decision making:

## Past Experiences

A person's past experiences can affect future decisions. If the past decision has turned out to be positive and beneficial, it will follow that individuals are bound to make similar decisions in a similar situation. On the contrary, past mistakes serve as learning experiences, so people tend not to repeat the same decision that turned out to be a failure.

## Cognitive Biases

Cognitive biases are the individual's thinking patterns rooted from observations and conclusions that sometimes lead to false assumptions, wrong judgments, and faulty reasoning. Cognitive biases include:

### Belief Bias

Making decisions based on a stock knowledge

### Hindsight Bias

Tendency to see events as inevitable once it occurs

### Omission Bias

Information that is deemed risky is eliminated

### Confirmation Bias

Examining what is expected from observations

## Individual Differences

Some of these individual differences that affect a decision are:

1. Age
2. Socioeconomic status
3. Educational background
4. Cognitive abilities

## Belief in Personal Relevance

This means that people make decisions on something that they strongly believe in.

## Escalation of Commitment

A decision is influenced by allotting a huge amount of time, money and effort into a decision where people feel committed to.

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## Review of Literature

Gärtner et. al (2018) studied the quality of instruments to assess the process of shared decision making and realized that due to the lack of evidence on measurement quality of decision making models, the choice for the most appropriate instrument can best be based on the instrument's content and characteristics such as the perspective that they assess. Researchers have found that incidental emotions pervasively carry over from one situation to the next, affecting decisions that should, from a normative perspective, be unrelated to that emotion (Han et al 2007, Keltner & Lerner 2010, Lerner & Keltner 2000, Lerner & Tiedens 2006, Loewenstein & Lerner 2003, Pham 2007, Vohs et al 2007, Yates 2007), a process called the carryover of incidental emotion (Bodenhausen 1993, Loewenstein & Lerner 2003).

Psychologists have devised a number of techniques to shed light on human decision processes in conjunction with targeted stimuli. Process tracing is a venerated suite of methods broadly aimed at investigating how people acquire, integrate, and evaluate information, as well as the physiological and neurological concomitants of cognitive processes (Schulte-Mecklenbeck et. al. 2010). Although not directly focused on the process of decision making (i.e., in terms of identifying decision strategies), a large literature assumes a linear compensatory model and aims to capture the weights people ascribe to different choice attributes (Louviere et. al. 1999 and Train, 2009). These methods, long known to social scientists (Bruch and Mare, 2012) rely on both field data—in which the analyst records decision makers' revealed preferences as reflected in their actions—and choice experiments—in which analysts enact control over key elements of the decision environment through vignettes. Stated-choice experiments have two advantages that are relevant in modelling choice processes: (a) They present decision makers with options unavailable in practice or outside their usual purview; and (b) they record multiple (hypothetical) choices for each decision maker, even for scenarios like mate choice or home purchase that happen only few times in a life span. The downside is that they are difficult to fully contextualize or make compatible with incentives; for example, experiment participants are routinely more willing to spend simulated experimental money than their own hard-won cash (Carlsson and Martinsson, 2001). Gupta, Hagerty and Myers (1983) suggested a novel methodological approach, applying a game-theoretic perspective in developing an experimental procedure for studying family decision-making. This is in marked contrast to the survey approach typical of much consumer-related family decision-making research. This approach appears particularly appropriate where attention is focused on examining the decision-making process and the negotiating and bargaining strategies used by families in arriving at decisions. Precedent for an experimental approach is also to be found in the family sociology literature (Kenkel 1963, Straus and Tallman 1971), though only one application has been made in consumer research (Arndt and Crane 1975). As in the

case of the Buss and Schaninger (1983) Model, the approach might also be strengthened, if it were extended beyond the dyad bargaining situation to multiple person negotiations. The role of children in family decision-making might then be examined. While the power construct can be explicitly manipulated, the extents to which the task captures the highly complex and dynamic character of family decision-making is also point of concern (Zelditch 1970). In particular, the environment in which the experiment is conducted may differ significantly from that typical of much family decision-making. Decision-making is likely to take place early in the morning before leaving for work or in the evening. It may be subject to interruptions and distractions by children and others, and may take place under conditions of time-pressure or when one or both spouses are tired. All of these factors may affect ability or willingness to concentrate on the task at hand, and tactics used in negotiating. Furthermore, the dynamics of family life may affect decision-making strategies. Decisions may have to be made concurrently, requiring the establishment of priorities. Spouses may not perceive or define problems in the same way (Aldous 1971). Consequently, negotiation may centre on what decision to make or what aspects are relevant, rather than the decision itself. This is in contrast to the clearly defined task of the laboratory situation. In addition, since families generally intend to stay together, a major objective in decision-making may be to reduce or minimize tension in family life and to sacrifice, rather than rigorously analyzing and negotiating each decision.

## Objectives of Study

1. To measure the components of inventory and model of Decision making power
2. To explore factor analysis of devised inventory for model of decision making power
3. To reach the normality test for devised model of decision making power

## Methodology

The study is based on an extensive field work and primary data collected through Multistage Sampling Technique. The field work was revolved to devise a model and inventory namely 'Decision Making Power among Women' (DMPW). Various parameters were evaluated in relation to sample. Content analysis using quantitative as well as qualitative approach was done to understand the decision making process, computing Percents and Frequencies, Arithmetic Mean, Standard Deviation and Standard Error, Levels of Significance, Skewness, Kurtosis and their Errors, Percentiles, Normality Test (Shapiro-Wilk), Reliability, Pearson's and Spearman's correlation, Exploratory Factor Analysis, One Way ANOVA and Chi Square Analysis.

## Results and Discussion

Decision making is a human and social process. It involves the use not simply of the intellectual abilities but also of intuition, subjective values and judgment. It is not a purely intellectual process. Perception and human judgment are indispensable and no technique can replace them. But knowledge and experience also provide basis for

correct decisions. The choice in decision making implies freedom to choose from among alternative courses of action without coercion. It also implies uncertainty about the final outcome. When there is no choice of action, no decision is necessary. The need for making any decision occurs only when some uncertainty as to outcome exists.

### Components of Decision Making Power

Rotated Component Matrix classifies 166 items of the inventory into seven components. The rotation is converged in 11 iterations, using varimax with Kaiser Normalization for rotation method through principal component analysis. The 1<sup>st</sup> component is represented by FD comprising 32 items. This component is labelled as 'Financial Decisions' and its items represent the group by 74 per cent to 87 per cent. The 2<sup>nd</sup> component comprises 27 items of FHD, which is labelled as 'Family and Household Decisions' and represents its items to the group by 71 per cent to 87 per cent. SD makes the 3<sup>rd</sup> component of inventory named as 'Social Decisions'. It comprises of 22 items with 78 per cent to 90 percent representation to its group. The 4<sup>th</sup> component is represented by LPD comprising 20 items, with 76 per cent to 92 per cent representation. This component is labelled as 'Legal and Political Decisions'. SID having 50 per cent to 71 per cent representation to its 33 items is 5<sup>th</sup> component of inventory, categorized as 'Self Identity Decisions'. The 6<sup>th</sup> component comprises 20 items of DD with 54 per cent to 83 per cent representation to its group. This component is labelled as 'Descendent Decisions'. The 7<sup>th</sup> component is named as 'Sex, Marriage and Reproductive Decisions', having 12 items of SMRD, with 40 per cent to 72 per cent representation to its group. In this way, the seven components extracted from 166 items of inventory can be rearranged and classified as:

1. Self Identity Decisions (SID)
2. Family and Household Decisions (FHD)
3. Social Decisions (SD)
4. Financial Decisions (FD)
5. Legal and Political Decisions (LPD)
6. Sex, Marriage and Reproductive Decisions (SMRD)
7. Descendant Decisions (DD)

### Exploratory Factor Analysis

The applicability of exploratory factor analysis for the inventory is favoured by Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test (KMO) and Bartlett's Test of Sphericity. The KMO shows 0.94 sample adequacy; while Bartlett's Test of Sphericity shows  $\chi^2$  (595, N = 600) = 646767.738,  $p = 0.000$ .

The item wise correlation matrix of 166 items of inventory shows highly significant ( $p < 0.001$ ) positive correlation on almost all the items of inventory. The Non-Parametric Test applied on inventory using chi-square goodness of fit test observes highly significance differences ( $p < 0.001$ ) among all 166 items of inventory, at different chi-square values with degree of freedom (df) 3-4. Hence, the null hypotheses are rejected in all cases of DMP.

Table 1 explains variances of seven components to be extracted from the inventory. The

initial Eigen values are found equal to extraction sums of squared loadings. This extraction method implies principal component analysis. However, rotation sums of squared loadings are obtained through varimax with Kaiser Normalization method. The total initial Eigen values and extraction sums of squared loadings on 7<sup>th</sup> component of inventory are 5.22. About 78.45 per cent of the variance is explained by all the seven components cumulatively. Component 1<sup>st</sup> is 16.71 per cent explaining the variance under consideration; while component 2<sup>nd</sup> is 14.18 per cent explain the variance. The 3<sup>rd</sup> component comprises 12.64 per cent variance of rotated sum of squared loadings. In case of 4<sup>th</sup> component, 10.99 per cent of variance explains component from all loadings. The 5<sup>th</sup> and 6<sup>th</sup> components explain 9.59 per cent and 9.01 per cent of variances respectively; while 7<sup>th</sup> component is 5.31 per cent explaining the variance of all factors. The Scree Plot in Fig. 1 further supports the Eigen values at all 166 items of the inventory.

### Component-Wise Sample Distribution and Normality Test

Norms for the inventory along with its reliability are presented in Table 2. The Cronbach's Alpha shows high reliability (95 per cent to 99 per cent) on all dimensions of DMP. The normal range of scores for 33 items of SID is 33-165. FHD could score as low as 27 and as high as 135 on its 27 items. The lowest range for 22 items of SD scores is 22 and highest range for same is 110. FD scores range from 32-160 on its 32 items. LPD and DD on 20 scores respectively range equally as low as 20 and as high as 100. The normal range of 12-60 scores is observed on 12 items of SMRD. As 20 items of DD are not applicable for never married women and ever married women without children, the total number of items applicable for them on inventory is 146, ranging 146-730 normal scores. Ever married women with live children are eligible for all the seven dimensions of inventory comprising 166 items with normal scores ranging from 166-830. Thus, in case of never married women and ever married women without live children, only six dimensions of inventory are applicable excluding DD; while in case of ever married women with live women, all the seven dimensions of inventory are applicable including DD. The percentiles of Turkey's Hinges ( $p_{25}$ ,  $p_{50}$  and  $p_{75}$ ) divide the scores of decision making into low, moderate and high levels. In case of SID, scores at  $p_{25}$  and below ( $\leq 88$  scores) are considered as low level; while  $p_{26}$  to  $p_{50}$  (scores from 89 to 144) are taken as moderate level. High level of SID is considered at  $p_{51}$  and above ( $\geq 145$ ). The scores  $\leq 72$  ( $p_{25}$  and below) are low scores for FHD; while scores 73-118 ( $p_{26}$  to  $p_{50}$ ) are viewed as moderate level and scores  $\geq 119$  ( $p_{51}$  and above) are considered as high scores for FHD. For SD scores  $\leq 59$  ( $p_{25}$  and below), 60-97 ( $p_{26}$  to  $p_{50}$ ) and scores  $\geq 98$  ( $p_{51}$  and above) are labelled as low, moderate and high levels of SD respectively. FD is perceived low at  $p_{25}$  and below (scores  $\leq 85$ ), moderate at  $p_{26}$  to  $p_{50}$  (scores 86-138) and high at  $p_{51}$  and above (scores  $\geq 139$ ). The low levels of LPD scores are  $\leq 53$  ( $p_{25}$  and below), moderate up to 54-86 ( $p_{26}$  to  $p_{50}$ ) and high at scores  $\geq 87$  ( $p_{51}$  and above). SMRD are low at  $p_{25}$  and

below (scores  $\leq 20$ ), moderate  $p_{26}$  to  $p_{50}$  (scores 21-40) and high at  $p_{51}$  and above (scores  $\geq 41$ ). Similarly, in case of DD, scores are low at  $p_{25}$  and below (scores  $\leq 53$ ), moderate at  $p_{26}$  to  $p_{50}$  (scores 54-86) and high at  $p_{51}$  and above (scores  $\geq 87$ ). The scores of DMP vary among ever married women and never married women as per the number of dimensions applicable to them. Among never married women and ever married women without live children, DMP scores low at  $\leq 389$  ( $p_{25}$  and below), moderate at scores 390-632 ( $p_{26}$  to  $p_{50}$ ) and high at scores  $\geq 633$  ( $p_{51}$  and above). On the contrary, DMP among ever married women with live children are low at scores  $\leq 441$  ( $p_{25}$  and below), moderate at scores 442-716 ( $p_{26}$  to  $p_{50}$ ) and high at scores  $\geq 717$  ( $p_{51}$  and above). Overall, DMP is low  $\leq 443$  scores ( $p_{25}$  and below), Moderate at scores of 444-720 ( $p_{26}$  to  $p_{50}$ ) and high at scores  $\geq 721$  ( $p_{51}$  and above). In this way, the three levels (low, moderate and high) are obtained on all the seven dimensions of inventory and for the whole inventors as a one broad factor.

Table 3 reveals that mean scores of never married women ( $M = 719$ ,  $SD = 21.57$ ) for their decision making is more than ever married women ( $M = 633$ ,  $SD = 12.03$ ). Thus never married women hold more decision making power than ever married women. Overall, DMP has  $M = 721$ ,  $SD = 17.50$ . SID ( $M = 142$ ,  $SD = 28.75$ ) and FD ( $M = 139$ ,  $SD = 29.19$ ) score more than SMRD ( $M = 34$ ,  $SD = 11.18$ ). LPD score almost similar to DD ( $M = 86$ ,  $SD = 13.44$  and  $M = 85$ ,  $SD = 21.57$  respectively); while FHD has  $M = 117$ ,  $SD = 29.59$ . The skewness and kurtosis measures are found close to zero on DMP and also

among all components of inventory and z-values of skewness and kurtosis are within  $\pm 1.96$ . This implies that data is skewed and kurtotic among all components of inventory and does not differ significantly from normality. The Shapiro Wilk test ( $p > 0.05$ ) (Shapiro and Wilk, 1965; Razali and Wah, 2011) and a visual inspection of normal Q-Q plot of DMP inventory (Fig. 2) show that DMP scores of inventory are approximately normally distributed for all its components (Cramer, 1998; Cramer and Hawett, 2004; Doane and Seward, 2011).

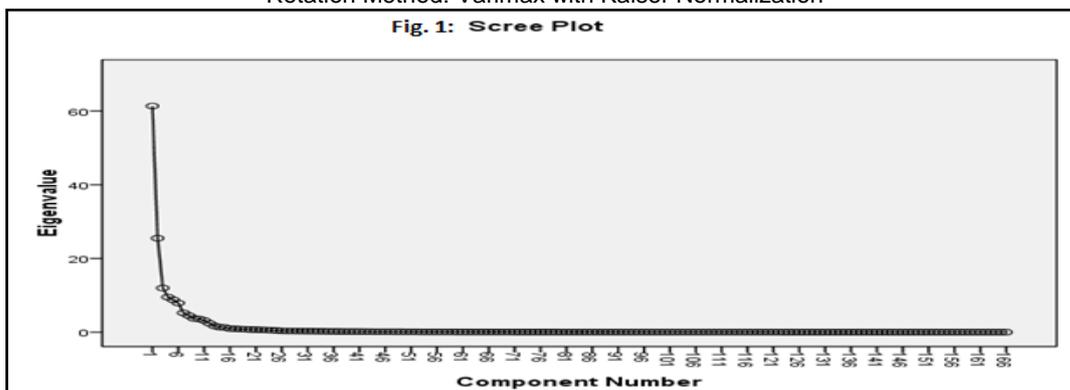
### Summary and Conclusion

Decision Making Power (DMP) among Women comprises 166 items of inventory with 70 per cent to 90 per cent representation. All its items in seven dimensions have shown highly significant differences. The mean scores DMP most depict masculine and familial decision making power in the family. The achieved reliability on all 166 items of inventory of DMP is almost equal to standard reliability measurements on different dimensions of DMP. The high reliability (95 per cent to 99 per cent) is found on all dimensions of DMP. The initial Eigen values are found equal to extraction sums of squared loadings and the Scree Plot supports the Eigen values at all 166 items of the inventory. Data is skewed and kurtotic among all dimensions of inventory and does not differ significantly from normality. The scores of DMP are approximately normally distributed for all its dimensions. The dimensions of inventory reveal less correlation with each other, supporting the factor loadings through principal component analysis.

**Table- 1: Variance Explained**

Components	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	61.339	36.951	36.951	61.339	36.951	36.951	27.747	16.715	16.715
2	25.485	15.352	52.303	25.485	15.352	52.303	23.553	14.188	30.904
3	11.980	7.217	59.520	11.980	7.217	59.520	20.988	12.644	43.547
4	9.516	5.732	65.253	9.516	5.732	65.253	18.255	10.997	54.544
5	8.795	5.298	70.551	8.795	5.298	70.551	15.920	9.590	64.135
6	7.905	4.762	75.313	7.905	4.762	75.313	14.962	9.014	73.148
7	5.223	3.147	78.459	5.223	3.147	78.459	8.816	5.311	78.459

Extraction Method: Principal Component Analysis  
Rotation Method: Varimax with Kaiser Normalization



**Table- 2: Norms for Decision Making Power (DMP) among Women**

S. No.	Dimensions	No. of Items	Normal Range	Reliability (Cronbach's Alphas)	Percentiles (Tukey's Hinges)			Qualitative Norms		
					P <sub>25</sub>	P <sub>50</sub>	P <sub>75</sub>	Low*	Moderate**	High***
1	Self Identity Decisions (SID)	33	33-165	0.966	88	144	156	≤88	89-144	≥145
2	Family and Household Decisions (FHD)	27	27-135	0.994	72	118	124	≤72	73-118	≥119
3	Social Decisions (SD)	22	22-110	0.990	59	97	101	≤59	60-97	≥98
4	Financial Decisions (FD)	32	32-160	0.991	85	138	141	≤85	86-138	≥139
5	Legal and Political Decisions (LPD)	20	20-100	0.991	53	86	89	≤53	54-86	≥87
6	Sex, Marriage and Reproductive Decisions (SMRD)	12	12-60	0.950	20	33	45	≤20	21-40	≥41
7	Descendant Decisions (DD)	20	20-100	0.975	53	86	88	≤53	54-86	≥87
• Decision Making Power (DMP) among Never married Women and Ever Married Women without Children		146	146-730	0.977	389	632	638	≤389	390-632	≥633
• Decision Making Power (DMP) among Ever Married Women with Live Children		166	166-830	0.989	441	716	734	≤441	442-716	≥717
• Decision Making Power (DMP)		166	166-830	0.989	443	720	741	≤743	444-720	≥721

Based on Field Survey

\* p<sub>25</sub> and below

\*\* p<sub>26</sub> to p<sub>50</sub>

\*\*\* p<sub>51</sub> and above

**Table- 3: Sample Distribution and Normality Test of DMP**

Variables	Mean	SD	S.E	Skewness	SE Skewness	Z- value Skewness	Kurtosis	SE Kurtosis	Z- value Kurtosis	Normality Test (Shapiro-Wilk)		
										Statistic	df	Sig.
<b>Self Identity Decisions</b>	142	28.75	0.82	-.03	.07	.42	.03	.14	.21	.825	1200	0.85
<b>Family and Household Decisions</b>	117	29.59	0.85	-.04	.07	.57	-.02	.14	.14	.763	1200	0.26
<b>Social Decisions</b>	98	20.59	0.59	-.05	.07	.71	.13	.14	.92	.684	1200	0.45
<b>Financial Decisions</b>	139	29.19	0.84	.06	.07	.85	-.17	.14	1.21	.697	1200	0.98
<b>Legal and Political Decisions</b>	86	13.44	0.38	.02	.07	.28	-.18	.14	1.28	.558	1200	0.25

<b>Sex, Marriage and Reproductive Decisions</b>	34	11.18	0.32	.01	.07	.14	.04	.14	.28	.669	1200	0.65
<b>Descendent Decisions</b>	85	21.57	0.88	-.11	.10	1.10	.13	.14	.92	.84	557	0.92
<b>Decision Making Power NM</b>	633	12.03	0.51	.12	.10	1.20	-.16	.14	1.14	.717	600	1.32
<b>Decision Making Power EM</b>	719	21.57	0.88	.12	.07	1.71	-.09	.14	.64	.795	600	1.40
<b>Decision Making Power</b>	721	17.50	1.92	0.03	0.07	0.42	0.22	0.14	1.57	.799	1200	1.46

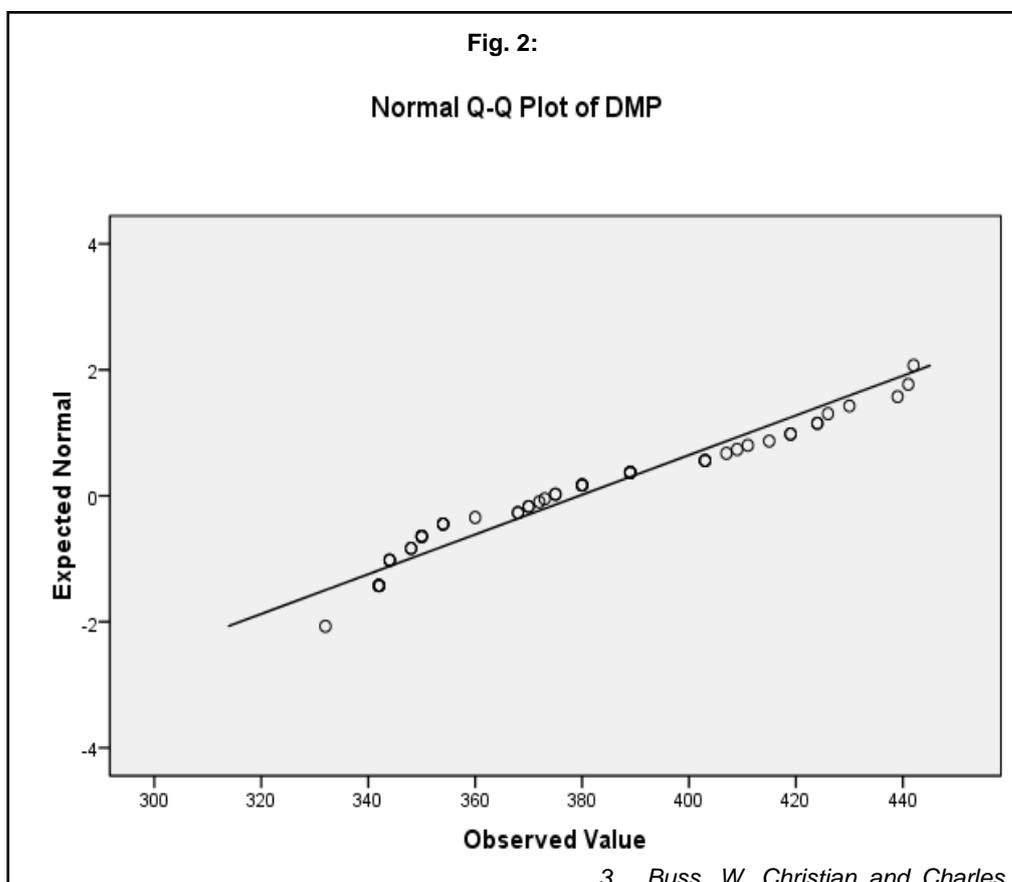
Based on Field Survey

N=1200

n of Mean =df in each variable

NM denotes Never Married

EM denotes Ever Married



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