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Some Morphometric Parameters of *Pomadasys Jubelini* in the New Calabar – Bonny River, Porthacourt, Nigeria

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Abstract: The morphometric parameters of *Pomadasys jubelini* were studied using 413 specimens from June 2011 to May 2013 using different fishing gears. The length of fish ranged from 9.60 – 55.3cm (TL). Positive allometric growth (J>1) was obtained for the length - girth relationship with growth rate values J = 1.21 and 2.28 for males and females respectively. Correlation coefficients (r) for male and female were 0.91and 0.82 respectively. "r" was positive for both sexes studies. The standard – pectoral fins' length relationship showed positive proportionate growth rate (b = 0.27) and r = 0.994. Positive proportionate growth was also obtained for total – pelvic fin's length relationships were b = 4.49 and r = 0.947. The relationship between the girth and head length was positive where b = 4.35 and the correlation coefficient r = was 0.678.
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Key words: length – breadth, pelvic fin, pectoral fin, *Pomadasys jubelini*

Introduction

The grunter *Pomadasys jubelini* belongs to the family Pomadasyidae. They play an important role in the ecology and fisheries of West Africa and other inland waters. It is a good source of nutritive protein with many essential nutrients required by the body (Eyo and Olatunde 2001). The relationship between morphometric parameters is an important fishery management tool. It is used in evaluating the growth of fish and the design of fishing gears (King 1996 and Sikoki *et al*., 1998).

The length-weight relationship of fish is an important fishery management tool. Its importance is pronounce in estimating the average weight at a given length group, and in assessing the relative well being of a fish population (Bolger and Connoly, 1989). Studies on the length - weight relationships on fish are extensive. Notable among these are the reports of Alfred – Ockiya (2000) for *Chana chana* in fresh water swamps of Niger Delta, Abowei and Davies (2009) on *Clarotes laticeps* of the fresh water reaches of the lower Nun River.

The adoption of the length-girth relationship for assessing and evaluating fish stock has been made by Abowei and Hart (2009) on the morphometric parameters of ten finfish species from the lower Nun River and Abowei and Davies (2009) on *Clarotes laticeps* of the fresh water reaches of the lower Nun River.

However, data on many tropical fish species and especially of *P. jubelini* is still lacking.

The New Calabar – Bonny River is one of the most important river systems in the Niger Delta providing good nursery ground for a large variety of fish. The intensive fishing activities in the river and along the shores reduces the catch per unit effort, speedy industrialization and other human activities increases the possibilities of the river becoming degraded. Therefore, data on the biology and morphometric parameters of fish has to be known. The objective of this study is to provide statistical information on the relationships between some morphometric parameters of the fish *P. jubelini* using its weight, pectoral fin, pelvic fin, head, total and standard length relationships.

Materials and methods

Pomadasys jubelini were collected from catch landings of fishermen using hooks, gill net, traps and calabashes monthly, from June 2011 to May 2013 from the New Calabar-Bonny River. The fish were transported in an insulated box containing ice chips to the fisheries laboratory of Department of Fisheries and Aquatic environment, Rivers State University of Science and Technology, Porthacourt, where the fish were identified and the weight(g) taken.

Total length of each fish (cm): From tip of snout to maximal extent of caudal fin.

Standard length (cm): From tip of snout to posterior end of caudal fin base.

Body depth (girth- length): This is taken round the deepest point of the fish exclusive of fleshy or bony structures.

Head length: This is measured with the mouth closed, from the tip of the snout to the posterior edge of the opercular bone.

Head width: This is the greatest dimension form one gill cove to the other in closed position

The lengths of the pectoral and pelvic fins were measured to the nearest cm using a measuring tape.

The length - weight relationship of the fish was estimated by the equation $W = aL^b$; where W= weight (g), L= length of fish (cm), a and b = regression coefficient and slope respectively. The logarithm-transformed data will give the linear regression equation

Log W = log a + b log L

Length – Girth Relationship

Length – girth relationship was determined by adopting the general power function used by King (1997)

$M = a (TL)^j$

Where: M = Girth, a = initial growth constant, j = growth rate exponent, TL = Total length. Coefficient of a and j shall be estimated by using Pauley (1983) after logarithmically transforming all data into form Log M = log a + J log TL

The relationships of pectoral and pelvic lengths, total and standard lengths, head and girth lengths were determined by the adoption of the length weight relationship formula of Bagenal and Tesch (1978).

Results

The variety of morphometric parameters taken for the fish sampled are given in table 1. The total length of fish had a range of 9.60cm to 55.30cm, gape width had a range of 1.30cm to 8.10 and the inter-orbital distance with a range of 2.30cm to 6.80cm.

The length-girth relationship of *P. jubelini* exhibited positive allometric growth (J=1.21 and 2.28 for males and females respectively). Correlation coefficients (r) for male and female were 0.91and 0.82 respectively. "r" was positive for both sexes studies (Table 2). The standard – pectoral fins' length relationship showed positive proportionate growth rate (b = 0.27) and r = 0.994 (Table 3). Positive proportionate growth was also obtained for total – pelvic fin's length relationships were b = 4.49 and r = 0.947. The relationship between the girth and head length was positive where b = 4.35 and the correlation coefficient r = was 0.678. The relationship between the girth length and gape width was a positive allometric one with b=3.27 and the correlation coefficient r = 0.239. A positive allometric growth b = 2.45 and r = 0.89 was obtained for the relationship between the gape with and the head length. Though, negative allometric growth patterns b= -0.26, r = 0.952 and b = 1.07, r=0.622 were observed for the pectoral-pelvic fin relationship and the head-pelvic fin width relationship respectively (Table 3).

Table 1. Morphometric parameters of *Pomadasys jubelini* in the New Calabar-Bonny River

Parameters measured	Range (cm)
Total length	9.60 – 55.30
Standard length	11.8 – 48.90
Girth length	7.90 – 36.60
Pectoral fin length	3.50 – 15.60
Pelvic fin length	1.20 – 10.50
Gape width	1.30 – 8.10
Head length	3.00 – 13.50
Head width	3.00 – 32.00
Inter-orbital distance	2.3 – 6.8

Table 2: Length – girth relationship for male and female

Sex	Total length (cm)	Girth length (cm)	a	J	r
Male	9.60 – 41.80	8.90 - 33.30	0.66	1.21	0.91
Female	10.20 - 55.30	9.30 - 48.10	0.63	2.28	0.82
Combined	9.60 – 55.30	8.90 – 48.10	0.71	0.18	0.92

Table 3. Relationship between morphometric parameters

Total – girth length	a = 0.71	b = 0.18	r = 0.926
Standard – girth length	a = 0.65	b = 0.59	r = 0.601
Total - pectoral fin length	a = 3.72	b = 0.44	r = 0.992
Standard - pectoral fin length	a = 0.30	b = 0.27	r = 0.994
Total – pelvic fin's length	a = 4.61	b = 4.49	r = 0.947
Pelvic – pectoral fin length	a = 1.21	b = 1.34	r = 0.952
Girth - head length	a = 1.73	b = 4.35	r = 0.678
Girth length and gape width	a = 0.03	b = 3.27	r = 0.239
Gape with and head length	a = 1.13	b = 2.45	r = 0.891
Head - pelvic fin width	a = 0.26	b = 1.07	r = 0.622
Gape – inter orbital width	a = 0.94	b = 0.53	r = 0.751

Discussion

The length – girth relationship of *P. jubelini* showed positive allometric growth (J>1). King (1991) also observed allometric length – breadth growth in *Illisha africana* in Qua Iboe estuary. Abowei and Hart (2009) observed positive allometric growth pattern length – breadth of ten fin fish species from the lower Nun River. Studies on the length – breadth relationship of *Clarotes laticeps* exhibited positive allometric growth (J = 1.18) (Abowei and Davies, 2009). The value of the length – breadth relationship in this study being greater than 1 implies that the girth-length of the fish increases faster than its total length. Ita and Maelahili (1997) reported the existence of linear relationship between body breadth (girth) and gill net selectivity. Fish species with larger body breadth were caught in lager mesh sizes, while fish with small body breadth swim across nets with lager mesh sizes because of its small size.

The maximum length of *Pomadasys jubelini* obtained in this study (55.30cm) and weight (2320g) are much higher than the lengths of 20 – 30cm and 50cm in Lake Kianji. Length and weight of 32.10cm and 882.4g have also been reported in River Ase (Nigeria) and in Senegal, (Reed *et al*., 1967, Idodo-Umeh, 2003, and Froese and Pauly, 2013). This variation in length and weights may be related to the growth stages, the level of exploitation of the fish species in different water bodies, predation by other fish species, nature of the aquatic environment and abundance of food for the fish species. Although King (1996) stated that the maximum size attainable for a fish is generally location specific. Abowei and Hart (2007) attributed the differences in maximum size of *Chrysichthys nigrodigitatus* in the lower river to high fishing pressure, environmental pollution and degradation. The fresh water reaches of the New Calabar-Bonny River are often subjected to outboard engine operation.

The relationship obtained between the morphometric parameters measured for *P. jubelini* was linear, it was also observed that lengths taken were highly and positively correlated. For instance an almost perfect correlation (0.99) was obtained between Total length, standard length, weight, girth length, pelvic length and pectoral fish length. The correlation coefficient also reveals that the individual parameters increase at the same rate. This indicates that the growth of fish in one area of the body is co-related to growth in another area of the body. Oniye *et al*. (2006), in their study of biology of *Protopterus annectens* in Jachi Dam stated that the high regression coefficient obtained for the relationship between pectoral and pelvic fins length should be taken that the pectoral fin grows at approximately the same rate as the pelvic fin though the pectoral fin is longer than the pelvic fin. The correlation coefficient of the pectoral/pelvic fins with the total length shows that they all increase at the same rate.

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Moments of Order Statistics From Independent Nonidentical Random Variables for Group Distributions

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Abstract: In this paper we derive a general relation for the moments of order statistics (o.s.) from independent and Nonidentically distributed (inid) random variables (r.v.'s) arising from a group of distributions. This group of distributions is represented by the cumulative distribution function (c.d.f.) in the form
$F(x) = 1 - b\,e^{-m\,\lambda(x)}$, $\beta \le x \le \delta$. Application for eight known distributions is given.

Key words: Order statistics, moments, nonidentically distributed random variables

1. Introduction

Let $X_1, X_2, \ldots, X_n$ be inid r.v.'s with c.d.f.'s
$F_i(x) = 1 - b\,e^{-m_i\,\lambda(x)}$, $\beta \le x \le \delta$, $i = 1,2,3,\ldots,n$.   Let $X_1 \le X_2 \le \cdots \le X_n$ denote the corresponding o.s. There are three known methods in the literature for deriving the moments of o.s. from inid r.v.'s.These three methods were adopted by Balakrishnan (1994a), Barakat and Abdelkader (2003), and Jamjoom and Al-Saiary (2011). The last method depends mainly on the results of the second method.

To derive the moments of o.s. from inid r.v.'s arising from this group of distributions we will also need the following theorem which was established by (Barakat and Abdelkader, 2003). They applied it to several continuous distributions such as: Erlang, Positive Exponential, Pareto, and Laplace distribution. Else it used to compute the moments of INID o.s from Erlang distribution (Abdelkader, 2003), Gamma distribution (Abdelkader, 2004), Burr type XII (Jamjoom, 2006) and Beta distribution (Abdelkader, 2008).

Theorem 1: Let $X_1, X_2, \cdots, X_n$ be independent nonidentically distributed r.v.s. The kth moment of all order statistics, $\mu_{r:n}^{(k)}$, for $1 \le r \le n$ and $k = 1, 2, \ldots$ is given by:

$$\mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} I_j(k) \qquad (1)$$

Where:

$$I_j(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum k \int_0^{\infty} x^{k-1} \prod_{t=1}^{j} G_{i_t}(x)\,dx, \quad j = 1, 2, \cdots, n \qquad (2)$$

$G_{i_t}(x) = 1 - F_{i_t}(x)$, with $\left(i_1, i_2, \cdots, i_n\right)$ is a permutation of $(1, 2, \ldots, n)$ for which

$i_1 \le i_2 < \cdots < i_n$.

Proof: The proof of this theorem can be found in Barakat and Abdelkader (2003).

Theorem 2: Let $X_1, X_2, \cdots, X_n$ be independent nonidentically distributed r.v.s. drawn from group of distributions with the formula

$$F_i(x) = 1 - b\,e^{-m_i\,\lambda(x)}, \quad \beta \le x \le \delta$$

The kth moment of all order statistics, $\mu_{r:n}^{(k)}$, for $1 \le r \le n$ and $k = 1, 2, \ldots$ is given by:

$$\mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}\left[I_j{}'(k+1) - \binom{n}{j}\beta^k \right] \tag{3}$$

Where

$$I_j{}'(k) = \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum b^j \sum_{t=1.}^{j} m_{i_t}$$

$$\times \int_{\beta}^{\delta} x^k \lambda'(x) e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}} dx, \quad j=1,2,\cdots,n \tag{4}$$

Where
$$0 \le \beta \le x \le \delta \le \infty$$

Proof
From theorem 1:

$$\mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} I_j(k) \tag{5}$$

where

$$I_j(k) = \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum k \int_0^{\infty} x^{k-1} \prod_{t=1}^{j}\left[1 - F_{i_t}(x) \right] dx, \quad j=1,2,\cdots,n \tag{6}$$

Let

$$F_i(x) = 1 - b\,e^{-m_i \lambda(x)}, \quad \beta \le x \le \delta \tag{7}$$

$$F(\beta) = 0 \Rightarrow 0 = 1 - b\,e^{-m_i \lambda(\beta)}$$

$$\Rightarrow b\,e^{-m_i \lambda(\beta)} = 1$$

$$\Rightarrow e^{-m_i \lambda(\beta)} = \frac{1}{b}$$

$$\Rightarrow \prod_{t=1}^{j} e^{-m_{i_t} \lambda(\beta)} = \prod_{t=1}^{j} \frac{1}{b}$$

$$\Rightarrow e^{-\lambda(\beta)\sum_{t=1}^{j} m_{i_t}} = \frac{1}{b^j} = b^{-j} \tag{8}$$

$$F(\delta)=1 \Rightarrow 1 = 1-b\,e^{-m_i\,\lambda(\delta)}$$

$$\Rightarrow b\,e^{-m_i\,\lambda(\delta)} = 0$$

$$\Rightarrow e^{-m_i\,\lambda(\delta)} = 0$$

$$\Rightarrow \prod_{t=1}^{j} e^{-m_{i_t}\,\lambda(\delta)} = 0$$

$$\Rightarrow e^{-\lambda(\delta)\sum_{t=1}^{j} m_{i_t}} = 0 \qquad\qquad (9)$$

Substituting from (9) in (6) we obtain:

$$I_j(k) = \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum k \int_{\beta}^{\delta} x^{k-1} \prod_{t=1}^{j} b\,e^{-m_{i_t}\,\lambda(x)}\,dx$$

$$= \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum k\,b^{j} \int_{\beta}^{\delta} x^{k-1} \prod_{t=1}^{j} e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}\,dx$$

Let:

$$u = e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}$$

$$du = -\lambda'(x)\sum_{t=1}^{j} m_{i_t}\,e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}\,dx$$

$$dv = x^{k-1}\,dx$$

$$v = \frac{x^{k}}{k}$$

$$I_j(k) = \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum k\,b^{j}\left[\left.\frac{x^{k}}{k}e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}\right|_{\beta}^{\delta}\right.$$

$$+ + \frac{\sum_{t=1}^{j} m_{i_t}}{k}\int_{\beta}^{\delta} x^{k}\,\lambda'(x)e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}\,dx\,\Big]$$

$$= \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum b^{j}\left[\delta^{k}\,e^{-\lambda(\delta)\sum_{t=1}^{j} m_{i_t}} - \beta^{k}\,e^{-\lambda(\beta)\sum_{t=1}^{j} m_{i_t}}\right]$$

$$+ \sum_{1\le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum b^{j}\left[\sum_{t=1}^{j} m_{i_t}\int_{\beta}^{\delta} x^{k}\,\lambda'(x)e^{-\lambda(x)\sum_{t=1}^{j} m_{i_t}}\,dx\,\right]$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (-\beta^k) + \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum b^j \left[\sum_{t=1}^{j} m_{i_t} \right.$$

$$\left. \times \int_{\beta}^{\delta} x^k \lambda'(x) e^{-\lambda(x) \sum_{t=1}^{j} m_{i_t}} dx \right] \qquad (10)$$

$$= -\binom{n}{j} \beta^k + I_j{}'(k)$$

Where

$$I_j{}'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum b^j \sum_{t=1}^{j} m_{i_t} \int_{\beta}^{\delta} x^k \lambda'(x) e^{-\lambda(x) \sum_{t=1}^{j} m_{i_t}} dx \qquad (11)$$

Substituting from (10) and (11) in (5) the proof finished.

For Exponential distribution

$$F(x) = 1 - e^{-\frac{x}{\theta}}, \qquad 0 \le x \le \infty$$

In (9) put $b = 1$, $m = \frac{1}{\theta}$, $\lambda(x) = x$, $\lambda'(x) = 1$, $\beta = 0$, $\delta = \infty$ we get

$$I_j{}'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (1)^j \left(\sum_{t=1}^{j} \frac{1}{\theta i_t} \right) \int_0^{\infty} x^k (1) e^{-x \sum_{t=1}^{j} \frac{1}{\theta i_t}} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \frac{1}{\theta i_t} \right) \int_0^{\infty} x^k e^{-x \sum_{t=1}^{j} \frac{1}{\theta i_t}} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\Gamma(k+1)}{\left(\sum_{t=1}^{j} \frac{1}{\theta i_t} \right)^k}$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{k!}{\left(\sum_{t=1}^{j} \frac{1}{\theta i_t} \right)^k} \qquad (12)$$

This result was obtained by Barakat & Abdelkader (2003).

For Beta type 1

$$F(x) = 1 - \left[\frac{\delta - x}{\delta - \beta} \right]^{p_i}, \qquad \beta \le x \le \delta, \, p_i > 0, \, \delta, \, \beta > 0 \qquad (13)$$

We can put (11) as

$$F(x) = 1 - e^{p_i \ln[\frac{\delta - x}{\delta - \beta}]}, \quad \beta \le x \le \delta, p_i > 0, \delta, \beta > 0 \qquad (14)$$

In (9) put $b = 1$, $m_i = -p_i$, $\lambda(x) = \ln[\frac{\delta - x}{\delta - \beta}]$, $\lambda'(x) = -\frac{1}{\delta - x}$, we get

$$I_j'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(-\sum_{t=1}^{j} p_{i_t}\right) \int_\beta^\delta x^k \left(-\frac{1}{\delta - x}\right) e^{\sum_{t=1}^{j} p_{i_t} \ln[\frac{\delta - x}{\delta - \beta}]} dx$$

$$I_j'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} p_{i_t}\right) \int_\beta^\delta x^k \left[\frac{\delta - x}{\delta - \beta}\right]^{\sum_{t=1}^{j} p_{i_t}} \frac{1}{\delta - x} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\left(\sum_{t=1}^{j} p_{i_t}\right)}{(\delta - \beta)^{\sum_{t=1}^{j} p_{i_t}}} \int_\beta^\delta x^k [\delta - x]^{\sum_{t=1}^{j} p_{i_t} - 1} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\left(\sum_{t=1}^{j} p_{i_t}\right) \delta^{\sum_{t=1}^{j} p_{i_t} - 1}}{(\delta - \beta)^{\sum_{t=1}^{j} p_{i_t}}} \int_\beta^\delta x^k \left[1 - \frac{x}{\delta}\right]^{\sum_{t=1}^{j} p_{i_t} - 1} dx$$

Substituting $y = 1 - \frac{x}{\delta}$

$$I_j'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\left(\sum_{t=1}^{j} p_{i_t}\right) \delta^{\sum_{t=1}^{j} p_{i_t} - 1 + k}}{(\delta - \beta)^{\sum_{t=1}^{j} p_{i_t}}}$$

$$\times \int_{\frac{\delta - \beta}{\delta}}^{0} (1 - y)^k y^{\sum_{t=1}^{j} p_{i_t} - 1} (-\delta dy)$$

$$I_j{'}(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{(\sum\limits_{t=1}^{j} p_{i_t}) \delta^{\sum\limits_{t=1}^{j} p_{i_t} + k}}{(\delta - \beta)^{\sum\limits_{t=1}^{j} p_{i_t}}} \frac{\delta - \beta}{\delta} \int_0^{\frac{\delta-\beta}{\delta}} y^{\sum\limits_{t=1}^{j} p_{i_t} - 1} (1-y)^k \, dy$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{(\sum\limits_{t=1}^{j} p_{i_t}) \delta^{\sum\limits_{t=1}^{j} p_{i_t} + k}}{(\delta - \beta)^{\sum\limits_{t=1}^{j} p_{i_t}}} \beta_{\frac{\delta-\beta}{\delta}}(\sum_{t=1}^{j} p_{i_t}, k+1)$$

$$\therefore \quad \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \left[\sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{(\sum\limits_{t=1}^{j} p_{i_t}) \delta^{\sum\limits_{t=1}^{j} p_{i_t} + k}}{(\delta - \beta)^{\sum\limits_{t=1}^{j} p_{i_t}}} \right.$$

$$\left. \times \beta_{\frac{\delta-\beta}{\delta}}(\sum_{t=1}^{j} p_{i_t}, k+1) - \binom{n}{j} \beta^k \right] \qquad (15)$$

This result was obtained by Jamjoom & Al-saiary (2010).

For Weibull distribution

Let $b=1$, $m_i = \frac{1}{\theta_i}$, $\lambda(x) = x^p$, $\lambda'(x) = p x^{p-1}$, $\beta = 0$, $\delta = \infty$

$$I_j{'}(k) = -\binom{n}{j}(0) + \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (1)^j$$

$$\times (\sum_{t=1}^{j} \frac{1}{\theta i_t}) \, p \int_0^\infty x^k \, x^{p-1} e^{-x^p \sum\limits_{t=1}^{j} \frac{1}{\theta i_t}} \, dx$$

Substituting $y = x^p \sum\limits_{t=1}^{j} \frac{1}{\theta i_t}$ **we get**

$$I_j{}'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{1}{(\sum_{t=1}^{j} \frac{1}{\theta i_t})^{\frac{k}{p}}} \int_0^\infty y^{\frac{k}{p}} e^{-y} \, dy$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\Gamma(\frac{k}{p}+1)}{(\sum_{t=1}^{j} \frac{1}{\theta i_t})^{\frac{k}{p}}}$$

$$\mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\frac{k}{P}!}{(\sum_{t=1}^{j} \frac{1}{\theta i_t})^{\frac{k}{p}}} \tag{16}$$

This result was obtained Barakat & Abdelkader (2000).
For Rayleigh distribution
By put p = 2 in (15) we get

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\frac{k}{2}!}{(\sum_{t=1}^{j} \frac{1}{\theta i_t})^{\frac{k}{2}}} \tag{17}$$

This result was obtained by Barakat & Abdelkader (2003).
For Pareto Distribution

$$F(x) = 1 - x^{-v} \qquad 1 \le x \le \infty$$

$$= 1 - e^{-v \ln x}$$

Let $b=1, \ m_i = v_i, \ \lambda(x) = \ln(x), \ \lambda'(x) = \frac{1}{x}, \ \beta = 1, \ \delta = \infty$

$$I_j{}'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (\sum_{t=1}^{j} v_i) \int_1^\infty x^{k-1} e^{-\ln x \sum_{t=1}^{j} v_{i_t}} \, dx$$

$$I_j{}'(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (\sum_{t=1}^{j} v_i) \int_\beta^\delta x^{k-\sum_{t=1}^{j} v_i - 1} \, dx$$

Let $\sum\limits_{t=1}^{j} \nu_i > k$

$$I_j{'}(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \nu_i\right) \left[\frac{x^{k - \sum\limits_{t=1}^{j}\nu_i - 1}}{k - \sum\limits_{t=1}^{j}\nu_i}\right]_1^{\infty}$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \nu_i\right) \left[1 - \frac{1}{k - \sum\limits_{t=1}^{j}\nu_i}\right]$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\sum\limits_{t=1}^{j}\nu_i}{\sum\limits_{t=1}^{j}\nu_i - k}, \qquad \sum_{t=1}^{j}\nu_i > k$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left[\sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\sum\limits_{t=1}^{j}\nu_i}{\sum\limits_{t=1}^{j}\nu_i - k} - \binom{n}{j}\right]$$

This result was obtained by Barakat & Abdelkader (2003).
For Exponentiated Frechet distribution:

$$F_i(x) = 1 - \left[1 - e^{-(\frac{\sigma}{x})^{\lambda}}\right]^{\alpha_i}, \qquad x > 0,\ \sigma > 0,\ \lambda > 0,\ \alpha > 0 \qquad\qquad (18)$$

See Nadarajah, S. & Kotz, S. (2003) and Badr, M. (2010).
We can put Eq (18) as:

$$F(x) = 1 - e^{\alpha_i \ln\left[1 - e^{-(\frac{\sigma}{x})^{\lambda}}\right]}, \qquad x > 0,\ \sigma > 0,\ \lambda > 0,\ \alpha_i > 0 \qquad\qquad (19)$$

$$Let \quad b = 1,\ m_i = -\alpha_i,\ \lambda(x) = \ln\left[1 - e^{-(\frac{\sigma}{x})^{\lambda}}\right],\ \lambda'(x) = -\frac{-\lambda \sigma^{\lambda} x^{-\lambda-1}}{e^{(\frac{\sigma}{x})^{\lambda}} - 1}\ in\ (9)\ we\ get$$

$$I_j'(k) = \sum_{1 \leq i_1 < i_2 < \cdots < i_j \leq n} \cdots \sum \left(-\sum_{t=1}^{j} \alpha_{i_t}\right) \int_0^\infty x^k \left(-\frac{\lambda \sigma^\lambda x^{-\lambda-1}}{e^{(\frac{\sigma}{x})^\lambda} - 1}\right)$$

$$\times e^{\sum_{t=1}^{j} \alpha_{i_t} \ln\left[1 - e^{-(\frac{\sigma}{x})^\lambda}\right]} dx$$

$$I_j'(k) = \lambda \sigma^\lambda \sum_{1 \leq i_1 < i_2 < \cdots < i_j \leq n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t}\right) \int_0^\infty x^{k-\lambda-1} \left[1 - e^{-(\frac{\sigma}{x})^\lambda}\right]^{\sum_{t=1}^{j} \alpha_{i_t} - 1}$$

$$\times e^{-(\frac{\sigma}{x})^\lambda} dx$$

By using binomial expanding we obtain:

$$I_j'(k) = \lambda \sigma^\lambda \sum_{1 \leq i_1 < i_2 < \cdots < i_j \leq n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t}\right) \int_0^\infty x^{k-\lambda-1}$$

$$\times \left(\sum_{l=0}^{\sum_{t=1}^{j} \alpha_{i_t} - 1} \binom{\sum_{t=1}^{j} \alpha_{i_t} - 1}{l} (-1)^l e^{-(l+1)(\frac{\sigma}{x})^\lambda}\right) dx$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \left[\lambda \sigma^\lambda \sum_{1 \leq i_1 < i_2 < \cdots < i_j \leq n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t}\right)\right.$$

$$\times \left. \left(\sum_{l=0}^{\sum_{t=1}^{j} \alpha_{i_t} - 1} \binom{\sum_{t=1}^{j} \alpha_{i_t} - 1}{l} (-1)^l \int_0^\infty x^{k-\lambda-1} e^{-(l+1)(\frac{\sigma}{x})^\lambda} dx\right)\right]$$

Let

$$y = (l+1)(\frac{\sigma}{x})^\lambda \Rightarrow x = \sigma(l+1)^{\frac{1}{\lambda}} y^{\frac{1}{\lambda}}$$

$$dx = -\frac{\sigma}{\lambda}(l+1)^{\frac{1}{\lambda}} y^{-\frac{1}{\lambda}-1} dy$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \left[\sigma^{\lambda} \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t} \right) \right.$$

$$\left. \times \left(\sum_{l=0}^{\sum_{t=1}^{j} \alpha_{i_t}-1} \binom{\sum_{t=1}^{j} \alpha_{i_t}-1}{l} \frac{(-1)^l}{(l+1)^{\frac{k}{\lambda}-1}} \int_0^{\infty} y^{-\frac{k}{\lambda}+1-1} e^{-y} dy \right) \right]$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \left[\sigma^{\lambda} \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t} \right) \right.$$

$$\left. \times \left(\sum_{l=0}^{\sum_{t=1}^{j} \alpha_{i_t}-1} \binom{\sum_{t=1}^{j} \alpha_{i_t}-1}{l} \frac{(-1)^l}{(l+1)^{\frac{k}{\lambda}-1}} \int_0^{\infty} y^{-\frac{k}{\lambda}+1-1} e^{-y} dy \right) \right]$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \left[\sigma^{\lambda} \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \alpha_{i_t} \right) \right.$$

$$\left. \times \left(\sum_{l=0}^{\sum_{t=1}^{j} \alpha_{i_t}-1} \binom{\sum_{t=1}^{j} \alpha_{i_t}-1}{l} (-1)^l \frac{\Gamma(1-\frac{k}{\lambda})}{(l+1)^{\frac{k}{\lambda}-1}} \right) \right] \qquad (20)$$

This result was obtained by Jamjoom & Al-saiary (2011 to appear).

For Erlang truncated Exponential distribution:

$$F(x) = 1 - e^{-\alpha x (1-e^{-\lambda})}, \qquad 0 \le x \le \infty, \alpha, \lambda > 0$$

$$b = 1, m = \beta(1-e^{-\lambda}), \lambda(x) = x, \lambda'(x) = 1, \beta = 0, \delta = \infty \text{ Let}$$

$$I_j{'}(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum (1)^j \left(\sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}}) \right)$$

$$\times \int_0^{\infty} x^k (1) e^{-x \sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}})} dx$$

$$I_j{'}(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}}) \right)$$

$$\times \int_0^{\infty} x^k e^{-x \sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}})} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\Gamma(k+1)}{(\sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}}))^k}$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\Gamma(k+1)}{(\sum_{t=1}^{j} \alpha (1 - e^{-\lambda_{i_t}}))^k} \qquad (21)$$

This result was obtained by Jamjoom & Al-saiary (2010) and (2011).
For Laplace Distribution

$$F_i(x) = 1 - \frac{1}{2} e^{-\alpha_i x} \qquad x > 0. \ \alpha > 0 \qquad (22)$$

In (9) put $b = \frac{1}{2}, m = \alpha, \lambda(x) = x, \lambda'(x) = 1, \beta = 0, \delta = \infty$ we get

$$I_j{'}(k) = \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \left(\frac{1}{2}\right)^j \left(\sum_{t=1}^{j} \alpha_{i_t} \right) \int_0^{\infty} x^k e^{-x \sum_{t=1}^{j} \alpha_{i_t}} dx$$

$$= \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{\Gamma(k+1)}{2^j (\sum_{t=1}^{j} \alpha_{i_t})^k}$$

$$\therefore \mu_{r:n}^{(k)} = \sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r}$$

$$\times \sum_{1 \le i_1 < i_2 < \cdots < i_j \le n} \cdots \sum \frac{k!}{2^j (\sum_{t=1}^{j} \alpha_{i_t})^k} \qquad (23)$$

This result was obtained by Barakat & Abdelkader (2003).

Table 1. The kth moments of the rth o.s. from independent nonidentical random variables for some distributions

Distribution	F(x)	$\lambda(x)$	$\lambda'(x)$	β	δ	b	m_i	$\mu_{r:n}^{(k)}$
Exponential	$1-e^{-\frac{x}{\theta}}$	x	1	0	∞	1	$\frac{1}{\theta_i}$	$\sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} \times \sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum \frac{k!}{(\sum \frac{1}{\theta_{i_t}})^k}$
Weibull	$1-e^{-\frac{x^p}{\theta}}$	x^p	$p\,x^{p-1}$	0	∞	1	$\frac{1}{\theta_i}$	$\sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} \times \sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum \frac{\frac{k}{P}!}{(\sum_{t=1}^{j}\frac{1}{\theta i_t})^{\frac{k}{P}}}$
Beta type I	$1-[\frac{\delta-x}{\delta-\beta}]^p$	$\ln[\frac{\delta-x}{\delta-\beta}]$	$\frac{-1}{\delta-x}$	β	δ	1	$-p_i$	$\sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} \times [\sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum [\frac{(\sum_{t=1}^{j}p_{i_t})\delta^{\sum_{t=1}^{j}p_{i_t}+k}}{(\delta-\beta)^{\sum_{t=1}^{j}p_{i_t}}} \times \beta_{\frac{\delta-\beta}{\delta}}(\sum_{t=1}^{j}p_{i_t},k+1) - \binom{n}{j}\beta^k]$
Rayleigh	$1-e^{-\frac{x^2}{\theta}}$	x^2	$2x$	0	∞	1	$\frac{1}{\theta_i}$	$\sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} \times \sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum \frac{\frac{k}{2}!}{(\sum_{t=1}^{j}\frac{1}{\theta i_t})^{\frac{k}{2}}}$
Pareto	$F(x)=1-x^{-\nu}$	$\ln(x)$	$\frac{1}{x}$	1	∞	1	ν_i	$\sum_{j=n-r+1}^{n} (-1)^{j-(n-r+1)} \binom{j-1}{n-r} \times \sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum [\sum_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\sum \frac{\sum_{t=1}^{j}\nu_i}{\sum_{t=1}^{j}\nu_i-k} - \binom{n}{j}]$

Distribution	$F(x)$	$\lambda(x)$	$\lambda'(x)$	β	δ	b	m_i	$\mu_{r:n}^{(k)}$
Exponentiated Frechet	$1-\left[1-e^{-(\frac{\sigma}{x})^\lambda}\right]^\alpha$	$\ln\left[1-e^{-(\frac{\sigma}{x})^\lambda}\right]$	$\dfrac{-\lambda\sigma^\lambda x^{-\lambda-1}}{e^{(\frac{\sigma}{x})^\lambda}-1}$	0	∞	1	$-\alpha_i,$	$\sum\limits_{j=n-r+1}^{n}(-1)^{j-(n-r+1)}\binom{j-1}{n-r}$ $\times[\sigma^\lambda\sum\limits_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\Sigma(\sum\limits_{t=1}^{j}\alpha_{i_t})$ $\times\left(\sum\limits_{l=0}^{\sum\limits_{t=1}^{j}\alpha_{i_t}-1}\binom{\sum\limits_{t=1}^{j}\alpha_{i_t}-1}{l}(-1)^j\dfrac{\Gamma(1-\frac{k}{\lambda})}{(l+1)^{\frac{k}{\lambda}-1}}\right)]$
Erlang Truncated Exponential	$1-e^{-\beta x(1-e^{-\lambda})}$	x	1	0	∞	1	$\alpha\times$ $(1-e^{-\lambda_i})$	$\sum\limits_{j=n-r+1}^{n}(-1)^{j-(n-r+1)}\binom{j-1}{n-r}$ $\times\sum\limits_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\Sigma\dfrac{\Gamma(k+1)}{(\sum\limits_{t=1}^{j}\alpha(1-e^{-\lambda_{i_t}}))^k}$
Laplace Distribution	$1-\frac{1}{2}e^{-\alpha x}$	x	1	0	∞	$\frac{1}{2}$	α_i	$\sum\limits_{j=n-r+1}^{n}(-1)^{j-(n-r+1)}\binom{j-1}{n-r}$ $\times\sum\limits_{1\le i_1<i_2<\cdots<i_j\le n}\cdots\Sigma\dfrac{k!}{2^j(\sum\limits_{t=1}^{j}\alpha_{i_t})^k}$

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Systematic Method for Constructing a Markov Model for the Safety of Systems

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Abstract: In large set of dependable systems, such as aircrafts, nuclear power plants, traffic control, monitoring and controlling medical equipment, parameters of reliability and safety are immensely important. In addition to the proper functioning, these systems must be designed in a way so that in case of an error in hardware and software they would stop functioning in a safe way so that no harm would come to anybody or anything; for example an airplane would conduct an emergency landing or a power plant would perform an emergency shutdown. One of the methods to secure a system is the use of redundancy in its structure. Redundancy can be embedded in different ways into the system and the NMR form is one of the conventional methods. When a system is designed with appropriate redundancy, it must be then analyzed and modeled in terms of safety and one of the common methods is the Markov process. This paper presents a systematic method for constructing a Markov model of the safety of systems and implements it in a number of prototype systems. Furthermore, the capability of the method for the direct construction of the Markov model for the NMR system of safety is also described.

Key words: Safety, Evaluation, NMR, TMR, Markov model, Redundancy.

1. Introduction

Nowadays, safe and fault-tolerant systems play a major role in the society. A safe system is defined as a system that is able to function properly in the presence of hardware errors, software errors, disturbances imposed from outside the system or user faults and does not act in a hazardous manner. For a certain set of reliable systems such as real-time embedded systems, commercial transaction systems, transportation control systems (e.g. railways, aircraft, ships and cars) nuclear power plant control systems, military and spatial systems and chemical industries (such as environments where toxic, flammable or explosive materials exist) safety is a very important parameter. Safety is the probability that in any given time, the system either functions properly (even if a software or hardware related error occurs) or it terminates its work in a manner that is safe and free from serious danger so that no harm comes to anybody or anything. The safety of system in the moment of t is the absence and avoidance of catastrophic consequences for the users and the surrounding environment of the system in the given time range [0, t] Safety can be increased through several methods; using proper and high quality components and subsystems, utilizing internationally approved standards in the design, construction and testing phases of a system, implementing auditing and validating methods and using redundancy are among the common methods.

Applying additional resources (implementing redundancy) may occur in the areas of hardware, software, time and information. It is obvious that any redundancy in the system, the size, price, power consumption and the number of system components will increase and this is the price that must be paid in order to increase the level of safety of a system. One of the mechanisms for implementing redundancy to improve safety in systems is the usage of hardware redundancy of static type (NMR form) in which the redundant modules-parallel to each other-function on the input and present the outcome of their work to a decision maker for the judgment of their output. The decision maker which in most cases is a majority detector circuit, inspects the output of the redundancy modules and in case of observing agreement in the majority of them, it selects the agreed number as the final output of the system. [2, 10, 11]. It is obvious that his system is safe as long as:

Most of its modules properly agree on a number, and if an agreement is not reached for the output of the majority of modules, then the next module of the system must be disabled in a safe and non-hazardous manner.

The Markov method can model and evaluate the system in order to inspect its safety. A systematic method for constructing the final Markov model of the safety of systems has been presented in this paper. We will describe the method in the form of an example and apply it for a number of other reliable systems. This paper is organized as follows: The second section briefly describes the Markov model. The third section describes the proposed systematic method for the construction of the Markov model of safety of systems and demonstrates its accuracy by the use two examples. The fourth section examines the process of direct construction of Markov model for NMR systems for safety by using the findings in section three and with a brief word the fifth section ends the paper.

2. Morkov Model

The Markov model was first introduced by a mathematician of the same name in the late 1960s. Markov proposed a particular mathematical model for the systems in which the future state of the system only depended on the present state and not on its past state. The "memoryless" property which is called the "Markov property" states that in case of the occurrence of defect, disorder and repair, the system passes from one state to the other and depending on the type of the system, this passing may have a fixed or variable rate [6]. The Markov model presents useful methods for evaluating the performance, reliability, availability and safety of the system. Furthermore, it models the independent and dynamic connections between the components of the system in a simple way. This model is used to assess the long-term reliability and safety of equipment that possess defined strategies of repair and maintenance and also to determine the "range of repair and inspect" of a system [8, 10]. Among the advantages of this model in comparison to hybrid modeling techniques, we can mention the simple modeling approach, the modeling of a newly configured system due to faults, modeling of the faulty components and the ones insulated against defects, complex modeling of repair and maintenance, modeling of complex systems and well-ordered events [2, 4, 5, 6].

The Markov model can be illustrated based on the definition of the reliability and safety of systems [3]. The constructed model is analyzed and the output of the model which is the amount of a number for the reliability or safety of the system is calculated [1].

3. INTRODUCING A SYSTEMATIC METHOD TO DRAW A MARKOV MODEL FOR THE SAFETY OF SYSTEMS

A. Single component safety model

In order to draw the Markov model for the safety of systems, by utilizing the definition of safety and in accordance with Fig. 1, two states will be considered for each component:

1. The mode in which the component is disabled in a 'safe' way. In this mode, the system is disabled but it does not harm the people or the surrounding environment and valuable objects.
2. The mode in which the component is disabled in an 'Un-safe' way. In this mode, the component shows hazardous manners and harms the people and its surrounding environment.

Thus, in drawing the Markov model of the safety of system, the two distinct modes of *FU* and *FS* for disabling the components of that system must be defined.
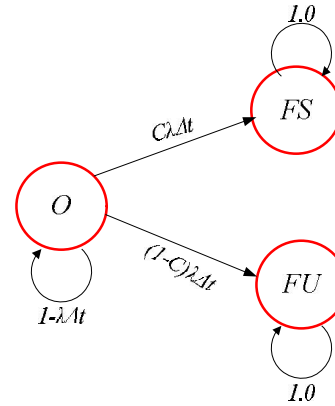
Fig. 1. The Markov of safety of a simple module.

In this figure, *C* is the probability that the system would reach the disability mode of *FS*. The safety mode of the system *S(t)* according to Markov is calculated as follows:

$$S(t) = P_O + P_{FS} = 1 - P_{FU} \qquad (1)$$

In the recent connection, P_o is the safe mode of the system, P_{FS} is the probability of the safe disability of the system and P_{FU} is the probability of the unsafe disability of the system. It is evident that the probability of the safety of the system in any instance is calculated by the adding the probability of safe modes and the safe disabling mode of the system.

B. Stating the method for drawing the Markov model for safety

We consider the model in Fig. 1 for a single component as the base model and describe the systematic method below for constructing the Markov model for the safety of a system. In order to simplify the understanding of the description, we shall explain the method through the use of TMR form (a specific mode of the NMR system when *n=3*). For the sake of simplicity, normally decision maker is considered to be ideal and we assume that:

1. The system starts functioning from the initial safe mode.
2. In any given instance, only one module can be defected and therefore the occurrence of two simultaneous and further defects is not possible.
3. Repair and maintenance does not exist in the system.

The proposed systematic method draws the Markov model for safety in four steps

Step 1. According to Fig. 2, the system starts to function with three intact modules. After some time, as a result of the occurrence of a defect one of the modules with the probability of *C* is disabled in a "safe" way and is transferred to mode *2-FS*. Therefore, with the probability of

(*1-C*) it is disabled in an "Un-Safe" way and enters the *2-FU* mode.
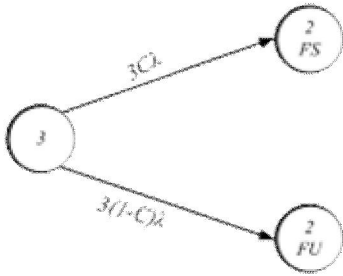
Fig. 2. A defect in one of the modules in the TMR system..

Step 2. Now the system is in of the two modes of *2-FS* or *2-FU*. Again with the probability of *C*, it is transferred from the *2-FS* mode to *1-FS-FS* and with the probability of (*1-C*) it is transferred to *1-FS-FU*. The very same mode of transference occurs in the mode of *2-FU* (Fig. 3).
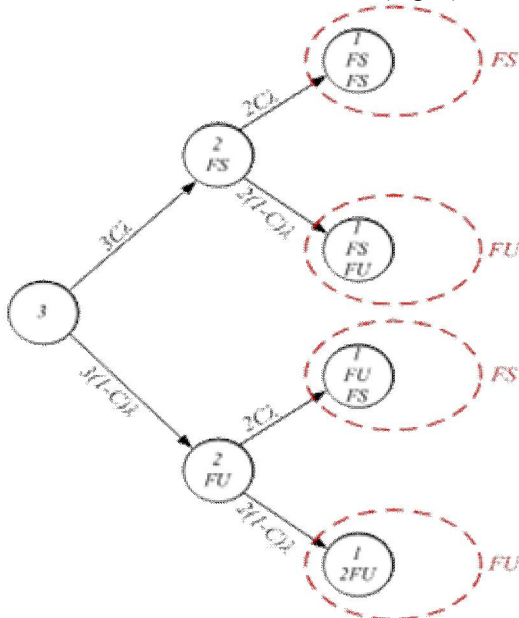
Fig. 3. A defect in the second module in the TMR system.

Step 3. We conduct the process in Section B for each and every new mode and we continue until the number of the intact modules drop to below *(n+1)/2* (n is the number of modules in the NMR system). At this point the "type" of the last modes must be determined (*FU* or *FS*). In order to determine the type of the mode, we must simply observe the manner with which the last module is disabled.

- If the module was last disabled in a "safe" way, we will consider its mode to be "safe".
- If the module was last disabled in an "Un-safe" way, we will consider its mode to be "Un-safe".

Fig. 4 demonstrates this method of applying "type" to mode.

Fig. 4. Applying the final type of mode of module in the last Algorithm.

Thus, the Markov model for safety of TMR system is formed as demonstrated in Fig. 5.
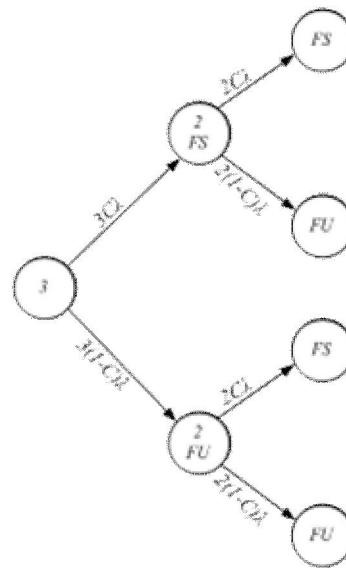
Fig. 5. The un-simplified final Markov model for safety of TMR system.

Step 4. In this stage, by combining the modes of *FS* with each other, and *FU* with each other, the Markov model is simplified (Fig. 6).
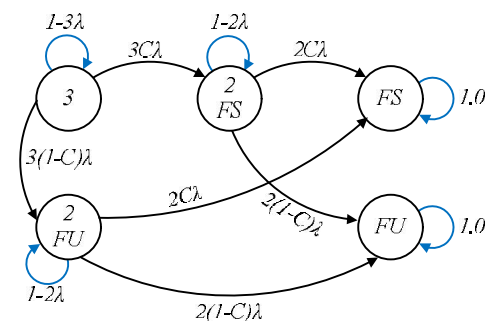
Fig. 6. The simplified final Markov model for safety of TMR system.

C. Drawing the Markov model for safety by the use of the proposed systematic method

In this section, we implement the above method to draw Markov model for safety of the 5MR and 7MR systems and we draw their Markov models. It should be noted that to this date, there has been no mention of these models in books and references.

C-1. Drawing the Markov model for the safety of 5MR system.

This system will produce an output if 3 modules out of the 5 modules function properly. The Markov model for safety of this system that has been constructed based on the proposed systematic method of this paper are demonstrated in Fig. 7 and 8.

It can be observed that the final Markov model for the safety of 5MR system contains ($5+1$) distinct modes that are organized in two lines. The first line consists of 4 modes in which the modules are disabled in a "safe" way and the second line consists of 3 modes in which the modules are disabled in an "Un-safe" way.

C-2. Drawing the Markov model for the safety of 7MR system.

This system will produce an output if 5 modules out of the 7 modules function properly. The initial Markov model is demonstrated in Fig. 9 and the final Markov model which contains ($2+7$) modes is demonstrated in Fig. 10. Also the final Markov models of 9MR and 11MR are shown in Fig. 11 and 12 respectively.

The first line of the final model consists of 5 modes in which the modules are defected in a safe and gradual manner and the second line consists of 4 modes in which the modules are disabled in an "Un-safe" and hazardous manner.

### D. Using the mentioned systematic methods for independent drawing of final Markov model for the safety of NMR systems.

One of the advantages of the mentioned systematic methods for drawing the Markov model for the safety of NMR systems is that the final Markov model for safety can be directly drawn (without drawing the initial model). By closely observing the mentioned final models of TMR, 5MR and 7MR in the third section of this paper and by considering the points below, the reader can easily draw the models:

- The Markov model for the safety of NMR system contains ($N+2$) modes that are organized in two lines. The first line consists of the intact mode and the fail-safe modes that are $(N+3)/2$ in number. The second line consists of the gradual defect of "Un-safe" modules which add up to $(N+1)/2$.
- From all the modes in the first line (except for the last mode of that line) to the modes of the second line, certain transferences with the probability ratio of ($1-C$) exist (meaning that the first mode of the first line is transferred to the first mode of the

second line - the second mode of the first line is transferred to the second mode of the second line and…).
- From all the modes in the second line (except for the last mode of that line) to the modes of the first line (except for its first two modes) certain transferences with the probability ratio of C occur (meaning that there is a transference from the first mode of the second line to the third mode of the first line - from the second mode of the second line to the fourth mode of the first line and …).
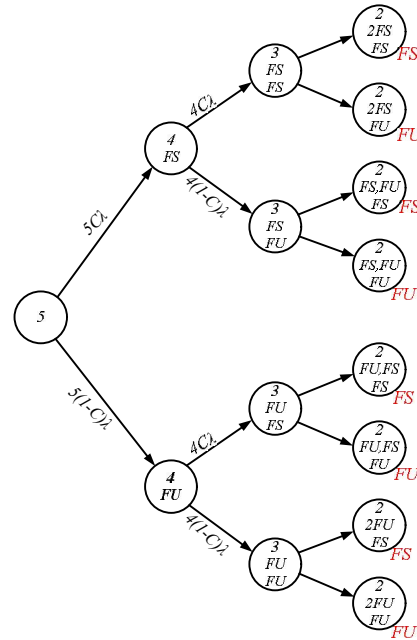
Fig. 7. The initial Markov model for the safety of 5MR system.
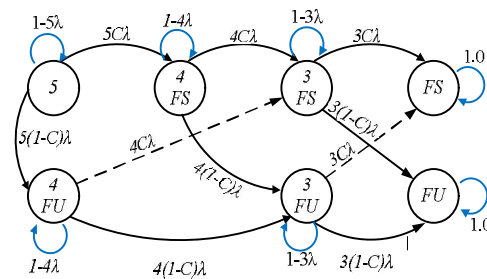
Fig. 8. The final Markov model for evaluating the safety of 5MR.
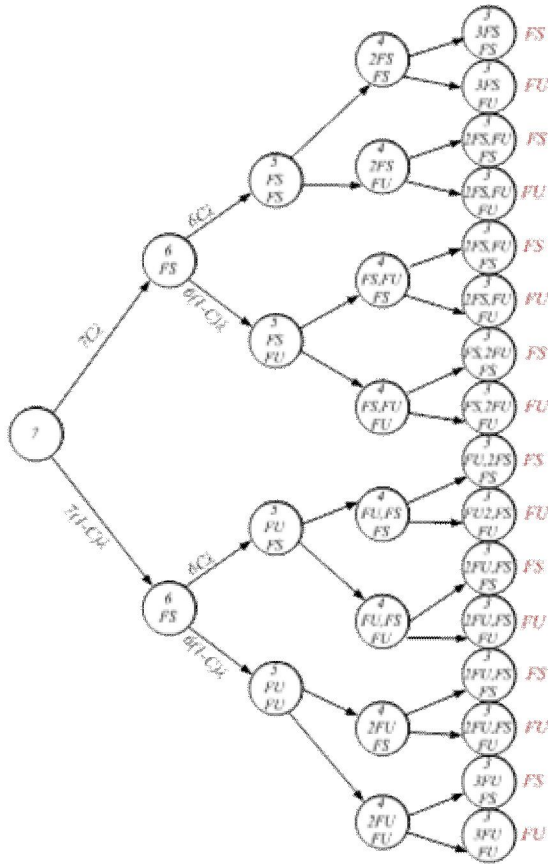
Fig. 9. The initial Markov model for the safety of 7MR system.
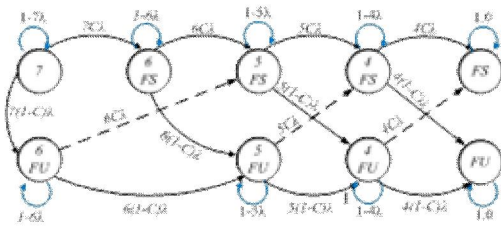
Fig. 10. The final Markov model for evaluating the safety of 7MR.
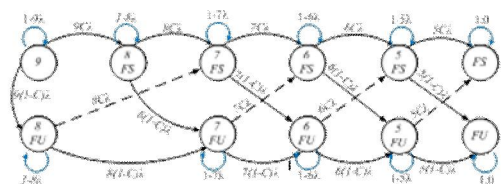
Fig. 11. The final Markov model for evaluating the safety of 9MR.
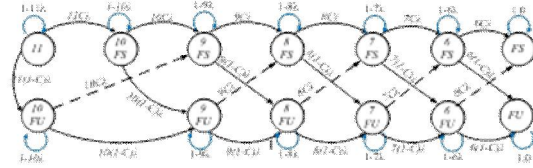
Fig. 12. The final Markov model for evaluating the safety of 11MR.

4. CONCLUSIONS

Based on the research and studies of the authors of this paper, to this date no method has been introduced for the systematic drawing of the Markov model of the safety of systems. In this paper, a systematic method for the Markov model of the safety of systems has been proposed and by its usage, the model of the TMR, 5MR, 7MR, 9MR and 11MR systems were drawn. Subsequently, by utilizing the drawn models, a general method for drawing the final Markov model for NMR systems was introduced.

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Toxicity of The Aqueous aAnd Alcoholic Extracts of *Nicotiana Tabacum* (Tobacco Plant) on Histopathological and Haematological Parameters of Albino Rats

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Abstract: This research work exposed albino rats to dosage of aqueous and alcoholic extracts of *N. tabacum*. Rat samples showed continued loss of weight and general body weakness; especially in the limbs. The animals treated with alcoholic extract showed sluggishness after each round of dosage administration. The rats became less and less active as each day passes. Some of the rats were paralysed, which may be as a result of the intravascular injection. There was mortality and constant weight-loss recorded at the end of the experiment. *N. tabacum* exhibited some remarkable histopathological effects like haemorrhagic discharges and congestion in the liver and kidney of the treated rat samples. Severe vacuolar degeneration was also observed in the liver of exposed rats. Haematological effects of *N. tabacum* include; decrease in PCV, haemoglobin, RBC, WBC and platelet counts in the exposed rat specimen. This has led to reduction in amount of dissolved oxygen needed to be transported to body cells for normal metabolic activities and also made the body defenseless to foreign pathogenic organisms. However, the slight increase in lymphocytes as observed in the aqueous extract of *N. tabacum* treated rats could indicate presence of toxic agents in the plant. Therefore, further research work will be recommended to carry out a bioactivity and directed fractionation to detect which chemical compound(s) among the secondary metabolites is responsible for each of the pharmaco-toxicological manifestations associated with *N. tabacum*.

1.Introduction

Toxicology is the study of the dynamic interaction of chemicals with living systems (Afshari and Hamadeh, 2004). The study is the science behind the numerous industries and regulatory agencies who are concerned about development and regulation of food additives and those concerned with use and remediation of hazardous chemicals. Over the years, with improved methodology and technology, toxicology slowly evolved from a science of high doses and insensitive end-points (e.g., death, changes in organ size or litter size) to a science of low (and environmentally-relevant) doses and of more sensitive end-points such as measurements of biochemical and functional changes in the immune system, endocrine system, and neurological system. Reduction in chemical exposure can, however, bring about less obvious effects which may be more difficult to detect. Therefore, results are more often expressed as ED50 of the effective dose (for whatever end-point selected for study) that leads to a 50% response of the test population. While these changes towards low doses and more sensitive end-points are encouraging, most current toxicology and regulatory policies that are based upon toxicological are still heavily dependent upon data derived from existing body of toxicological data which includes to a large extent high-dose studies. The result is that toxicologists and risk assessors, in order to relate this large database of high-dose data to relevant low-dose situations of today, must use 'high-dose to low-dose extrapolation', which is the practice of deriving effects thresholds for small concentrations of chemicals from studies that used much higher concentrations that often produce different types and severity of effects.

Tobacco (*Nicotiana tabacum L.*) is the dried leaf of a plant that grows in many parts of the world. Tobacco is also an agricultural product processed from the leaves of plants in the genus *Nicotiana*. It can be consumed, used as an organic pesticide and in the form nicotine tartrate (in medicine). It is commonly used as a recreational drug, and is a valuable cash crop for countries like Cuba, China and United States. Many plants contain nicotine, powerful neurotoxin to insects. However, tobacco contains a higher concentration of nicotine than most other plants. Unlike many other *Solanaceae*, they do not contain tropane alkaloids, which are often poisonous to humans and other animals. Despite containing enough nicotine and other compounds such as germacrene, anabasine and other piperidine alkaloids (varying between species), which are powerful enough to deter most herbivores (Benowitz, 1990). A number of such animals have developed the ability to feed on

Nicotiana species without being harmed. Nonetheless, tobacco is unpalatable to many species, and therefore some tobacco plants (chiefly tree tobacco, *N. glauca*) have become established as invasive weeds in some species.

Tobacco contains the following phytochemicals; Nicotine, Anabasine (an alkaloid similar to nicotine but less active), Glucosides (tabacinine and tabacine), 2,3,6-Trimethyl-1,4-naphthoquinone, 2-Methylquinone, 2-Naphylamine, Propionic acid, Anatalline, Anthalin, Anethole, Acrolein, Anatabine, Cembrene, Choline, Nicotelline, Nicotianine, Pyrene (Cerami *et al.*, 1997).

Nicotine binds stereo-specifically to acetylcholine receptors at autonomic ganglia, the adrenal medulla, neuromuscular junction and the brain. As a consequence of the stimulation of nicotinic receptors possibly located on presynaptic sites, short-term exposure to nicotine results in the activation of several central nervous system neuro-human pathways, leading to the release of acetylcholine, norepinephrine, dopamine, serotonin, vasopressin, growth hormone and ACTH.

Nicotianas are highly toxic plants due to their nicotine alkaloid content. The effects of nicotine alkaloid are as a result of the summation of actions at ganglionic sites, motor end-plates and smooth muscle. The central nervous system is affected, initially by stimulation, resulting in tremors and convulsions, progressing to depression. Death occurs from respiratory failure. Vomiting is a result of stimulation of the emetic chemoreceptor trigger zone.

The cardiovascular responses are generally due to stimulation of sympathetic ganglia and adrenal medulla combined with discharge of catecholamines. The target organs are nervous system and heart.

However, Tobacco has been used as an antispasmodic, a diuretic, an emetic, an expectorant, a sedative, and a sialagogue, and in homeopathy. Tobacco has a long history of use by medical herbalists as a relaxant, though since it is a highly addictive drug it is seldom employed internally or externally at present. The leaves act as antispasmodics, discutients, diuretics, emetics, expectorants, irritants, sedatives and sialagogues. They are used externally in the treatment of rheumatic swelling, skin diseases and scorpion stings. The plant should be used with great caution, when taken internally it is additive. The active ingredients can also be absorbed through the skin. Wet tobacco leaves can be applied to stings in order to relieve the pain. They are also a certain cure for painful piles. A homeopathic remedy is made from the dried leaves. It is used in the treatment of nausea and travel sickness. Some other activities reported for *N. tabacum* are: Anagelsic activity, anaesthetic activity, angiogenesis inhibition, antibacterial activity, anti-cunvulsant activity, anti-estrogenic effect, antifungal activity, aromatase inhition, arrhythmogenic effect, anti-stress effect, antiviral activity, antiglauconic activity, antioxidant activity, carcinogenic activity, broncho-constrictor activity and bupivacaine kinetics.

The aim of this research is therefore to investigate the effects of *N. tabacum* on the tissues of white rats, so as to get baseline information as to predict the effects of tobacco consumption on human tissues.

Materials and Methods

11 Albino rats (*Rattus novegicus*) with average age of 4 months and average weight of 175.61g were gotten from the same source in the Department of Zoology, Olabisi Onabanjo University, Ago-Iwoye Ogun State, Nigeria. 7 rats were selected for the research out of which 6 were used to test for the toxicity of each extract, i.e. 3 rats for alcoholic extract and the other 3 for aqueous extract analysis. The last rat was used as a control test. The fresh leaves of *N. tabacum* used in this research work was gotten from a farmland in Ago-Iwoye, Ogun State and was identified by Mr. Akasoro of the Department of Plant and Applied Zoology, Olabisi Onabanjo University, Ago-Iwoye Ogun State.

Preparation of Animal Samples

The rats were weighed and allowed to acclimatize for 7 days. They were allowed pure distilled water, uncontaminated grower mash and a conducive environment. No mortality was however recorded during the process of acclimatization. After the expiration of 7 days, the rats were divided into three groups and were selected in relevance to their similarity in body weight. Group 1 contained the control specimen. Group 2 contained the rats administered with aqueous extract while Group 3 consisted of rats administered with alcoholic extracts.

Extraction of the Botanicals

Aqueous Extract: The aqueous extract was prepared in line with USDHHS (2008) specifications for tobacco extraction methods and formulations. The fresh plant was crushed in mortar, 90g of the finely ground fresh plant was weighed and put in a clean jar. 1 Lt of distilled water was brought to 85°C and poured over the weighed and crushed plant and then allowed to steep and cool for about 2 h. The mixture was then filtered to remove the shaft.

Alcoholic Extract: The alcoholic extract was prepared using fresh leaves and stem of the plant. The plant parts used were crushed with pestle and mortar. 25g the crushed plants was mixed with 1 Lt of 100% alcohol according to IARC (2009). The mixture was

25

sieved with a fine cloth and the residue was collected after filtration.

Method of Administration

Aqueous Extract: The dosage administered to the rats was 5ml/kg body-weight of each rat (Adeniyi *et al.*, 2010). The rats were water-starved for 4 h by removing all water cans from their cells from 8.00 am to 12.00 noon, before the aqueous extract was administered on them. The extract was suctioned into a needle hypodermic syringe with relevant dosage (according to the rats' body-weight) was pumped gently into the rat's mouth according to Adeniyi *et al.*, 2010. The extract was administered on the rats for 21 days continuously; each rat is being sacrificed at 7 days' interval.

Alcoholic Extract: The alcoholic extract was injected into the body of the rats via the region of intravascular injection, *gluteous meteaus*. Each rat was given a dosage of 2ml/kg of body-weight. The rats were injected 12.00 pm daily and were not starved of clean water and animal feed. The extract was administered on the rats for 21 days continuously; each rat is being sacrificed at 7 days' interval.

Sample Collections

Group 2 Specimen (Aqueous Extract): After administration of the aqueous extract, the rats were reweighed and each of the 3 rats was sacrificed at of 7 days interval until the 21st day. The blood was collected with hypodermic syringe and stored in EDTA bottle. The heart, pancreas, liver, kidneys and brain were removed and stored separately in universal

bottles containing bovine solution as the preservative. The samples were kept cooler and taken to the laboratory for analysis.

Group 3 Specimen (Alcoholic Extract): After administration of the alcoholic extract, the rats were reweighed and each rat was sacrificed at interval of 7 days until the 21st day. The blood was collected with a hypodermic syringe and stored in EDTA bottle. The heart, pancreas, liver, brain and kidneys were removed and stored separately in universal bottles containing bouin solution as the preservative. The samples were kept cooler and taken to the laboratory for analysis.

Analysis of Samples

All the collected samples were taken to the Department of Physiology, University of Ibadan, Nigeria for the histopathology and haematology analysis. Haematology parameters investigated are: Packed Cell Volume (PCV), Red blood Cell (RBC), White Blood Cell (WBC), Platelet (Plt), Lymphocyte (Lym), Eosinophil (EOS), Neutrophil (N), Monocytes (M) and Haemoglobin count (Hb).

Results and Discussion

After the dosage administration of the extracts, the behavioural, physiological, histopathological and haemotological observations of the rats were recorded.

Behavioural and Physiological Changes: After each round of dosage administration, the rats were observed for 1 h to check if the dosage is the lethal dosage (LD50) or if the concentration is the lethal concentration (LC50).

Table 1: Weight Changes as Observed in the Groups

Group	Duration of Exposure (days)	Mortality rate	Initial body weight (g)	Final body weight (g)	Body weight difference	% weight difference
Control	0	0	157.43	157.43	0	0
Control	7	0	157.43	163.01	5.58	3.54
Control	14	0	163.01	179.80	16.79	10.30
Control	21	0	179.80	221.32	41.52	23.09
Aqueous Extract	0	0	174.87	174.87	0	0
Aqueous Extract	7	1	174.87	179.26	4.39	2.51
Aqueous Extract	14	0	179.26	182.94	3.68	2.05
Aqueous Extract	21	0	182.94	183.66	0.72	0.39
Alcoholic Extract	0	0	194.53	194.53	0	0
Alcoholic Extract	7	1	194.53	198.78	4.25	2.18
Alcoholic Extract	14	0	198.78	183.44	-15.34	-7.72
Alcoholic Extract	21	0	183.44	162.24	-21.2	-11.56

Table 2: Histopathological Changes Observed in the Heart, Kidney, Brain, Spleen and Liver

	Organ	Lession	Haemorrhages	Hepatocytes	Necrosis	Congestion	Vacuolar Degeneration
Control	Heart	-	-	-	-	-	-
	Kidney	-	-	-	-	-	-
	Brain	-	-	-	-	-	-
	Liver	-	-	-	-	-	-
	Spleen	-	-	-	-	-	-
Aq. Extract	Heart	-					
	Kidney		++			++	
	Brain	-					
	Liver		++			++	+++
	Spleen	-					
Alc. Extract	Heart	-					
	Brain	-					
	Kidney	-				+++	
	Liver					+	
	Spleen	-					

Key: - = completely absent, + = present, ++ = mild, +++ = severe

Table 3: Haematological Data for the Groups of the Rats for the Duration of Study

Week	Group	PCV%	Hb(g/dl)	RBC (10^{-2}/C)	WBC (x 10^9/L)	PLT (x 10^9/L)	LYM	Neu	Eos	M
1	Aqueous	30	9.6	4.32	9600	54000	89	18	1	11
	Alcohol	16	4.8	2.41	4900	5000	60	37	1	2
	Control	46	14.6	7.31	10500	108000	75	21	1	2
2	Aqueous	10	2.8	1.04	2400	60000	53	42	3	2
	Alcohol	36	11.7	5.91	12900	1945000	21	67	1	2
	Control	46	14.6	7.31	10500	108000	75	21	1	2
3	Aqueous	-	-	-	-	-	-	-	-	-
	Alcohol	-	-	-	-	-	-	-	-	-
	Control	-	-	-	-	-	-	-	-	-

Table 4: ANOVA of Haematological Data

		Sum of Sq.	Df	Mean Square	F	Sig. Dif.
PCV	Between Groups	9.54	2	4.77	0.1022	0.063
	Within Groups	140	3	46.66		
	Total	149.54	5			
Haemoglobin	Between Groups	15.65	2	7.825	0.7931	0.346
	Within Groups	29.6	3	9.866		
	Total	45.25	5			
RBC counts	Between Groups	2.54	2	1.27	0.3202	0.1759
	Within Groups	11.9	3	3.966		
	Total	14.4	5			
Platelet Counts	Between Groups	1.28+0.02	2	6.40+0.01	1.509	0.501
	Within Groups	1.27+0.02	3	4.24+0.01		
	Total	2.55+0.02	5			
WBC Counts	Between Groups	1.25+0.02	2	6.26+0.01	1.543	0.9039
	Within Groups	1.21+0.02	3	4.04+0.01		
	Total	1.38+0.02	5			
Lymph	Between Groups	189.7	2	948.55	18.9	0.9267
	Within Groups	150	3	50		
	Total	2047.1	5			
Neutrophil	Between Groups	150.5	2	75.25	28.28	0.949
	Within Groups	8	3	2.66		
	Total	158.5	5			

Group 1 animals were active and healthy as they gain weight (Table 1) constantly throughout the period of the experiment.

Group 2 animals showed no behavioural changes but moved on with their normal activities. They were also physiological sound. There was a single mortality (Table 1) recorded at a particular time in the group and constant weight-loss during the experiment.

Group 3 animals showed sluggishness after each round dosage administration. This could be due to the effect of alcohol in the extract. As each day passes, the rats became less and less active. Some of the rats were paralysed, which may be as a result of the intravascular injection. There was mortality (Table 1) and constant weight-loss recorded at the end of the experiment.

Histopathological analysis (Table 2) showed that the organs of control animals were not adversely affected over the period of dosage administration. However, the livers and kidneys were affected with haemorrhages and congestion from the dosage administration of aqueous extract of *N. tabacum*. The liver also suffered a considerable degree of vacuolar degeneration (Table 2) from exposure to aqueous extract of *N. tabacum*. The kidney was badly congested with alcoholic extract of *N. tabacum*. This is similar to reports of (El Gamal, 2006) where the hearts, livers and kidneys of the sample rats showed severe congestion over exposure to alcoholic extract of *N. tabacum*. Catarrhal enteritis and fatty discharge are always the physical manifestations accompany acute liver and kidney congestions over a longer period of continued exposure (Khalid, 2002).

The PCV measured at the end of week 2 indicated a significant difference of LSD (0.063) which is > 0.05, indicating that there is no significant difference in the results observed during the weeks of exposure. There was an increase in PCV from week 1 to week 2 but lower than that of the control at the end of week 2. The haemoglobin measured at the end of week 2 indicated a significant difference of LSD (0.346). Since this value is greater than 0.05, it also indicate that there is no significant difference during the exposure period. There was an increase in haemoglobin from week 1 to week 2 but lower than that of the control at the end of week 2.

The haemalogical data (Table 3) showed decrease in PCV from Control through aqueous extract to alcoholic extract. The haemoglobin counts also reduce in the like manner. Similarly, the RBC, WBC and platelets reduced considerably in exposure of the sample animals to alcoholic extract of *N. tabacum*. However, there was increase in lymphocytes counts with aqueous extract administration. This could be connected with the aqueous nature of the active ingredients in the extract. Similar reports (Kausal *et*

al., 2008*)* showed congestion of the sinusoids and accumulation of lymphocytes in the liver of rats treated extracts of *N. tabacum*. The effects of the exposure also include degeneration and necrosis of the renal glomeruli and cortical tubular cells. These tubules contain desquamated cells or acidophilic homogenous material. Ranivar and Chatterjee (2009) reported presence of lymphocytic aggregates in the cortex coupled with dilation of renal convoluted tubules and scattered haemorrhagic foci in the renal interstitial tissue of the rats exposed to extracts of *N. tabacum*. (Kausal *et al.*, 2008) suggested that the hepatic microsomal enzymes as well as the mitochondrial membranes are vulnerable to the peroxidative attack of *N. tabacum* and may be instrumental in leading to the hepatotoxicity symptoms observed in *N. tabacum* treated animals. The intermittent diarrhea may attribute to gastroenteritis or to the parasympathomimthic cholinergic effect of the plant constituents (El Gamal, 2006). Hyperaesthesia, depression and weakness of the limbs may be attributed to hepatornal insufficiency or significant reduction of the cardiac muscles which may lead lately to congestive heart failure and/or the involvement of the nervous system.

Conclusion

Exposure of rat samples to *N. tabacum* showed continued loss of weight and general body weakness; especially in the limbs. This could have affected the muscles, and as a result, have some connections with and interruptions of the CNS. *N. tabacum* exhibited some remarkable histopathological effects by creating haemorrhagic discharges and congestion in the liver and kidney of the treated rat samples. Severe vacuolar degeneration was also observed in the liver of exposed rats. Liver vacuolar degeneration could be so dangerous leading to cirrhosis (liver damage), widespread formation of nodules and fibrosis in the liver, poor metabolic activities of vital organs in the body and eventually (inevitably) death. Haematological effects of *N. tabacum* include; decrease in PCV, haemoglobin, RBC, WBC and platelet counts in the exposed rat specimen. This has led to reduction in amount of dissolved oxygen needed to be transported to body cells for normal metabolic activities and also made the body defenseless to foreign pathogenic organisms. However, the slight increase in lymphocytes as observed in the aqueous extract of *N. tabacum* treated rats could indicate presence of toxic agents in the plant. Therefore, further research work will be recommended to carry out a bioactivity and directed fractionation to detect which chemical compound(s) among the secondary metabolites is responsible for each of the pharmaco-

toxicological manifestations associated with *N. tabacum*.

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Screening of Clinically Isolated *Staphylococcus aureus* for Methicillin Resistance and Enterotoxin Production

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Abstract: Biochemically identified *S. aureus* isolates from the various clinical specimens from Lagos Central District healthcare centres were screened for methicillin using MRSA agar (CHROMagar). Production of enterotoxins were detected using the RIDASCREEN® SET Total kit (r-biopharm) while filtrates of the positive samples were screened for specific enterotoxins using RIDASCREEN® SET A, B, C, D, E (r-biopharm) according to manufacturer instructions. Of the 43 coagulase positive *S. aureus* isolates, 22(51.0%) were identified as methicillin resistant *S. aureus* while 21 (49.0%) were methicillin sensitive *S. aureus*. Of the 43 *S. aureus* tested for enterotoxin, six (13.9%) possessed single enterotoxins while 4 (9.3%) possessed more than one type of enterotoxin. It also showed that coagulase-positive *S. aureus* from wound swabs had highest number of positive enterotoxins antibodies. Therefore, all *S. aureus* isolated from the laboratory specimen especially from wound specimen should be tested for enterotoxin.
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1. INTRODUCTION

Carriage of *Staphylococcus aureus (S. aureus)* appears to play a key role in the epidemiology and pathogenesis of infection (Kluytmans et al., 1997; Odu and Okonko, 2012). The ecological niches of *S. aureus* are the anterior nares (Odu and Okonko, 2012). In healthy subjects, over time, three patterns of carriage can be distinguished: about 20.0% of people are persistent carriers, 60% are intermittent carriers, and approximately 20% almost never carry *S. aureus* (Kluytmans et al., 1997; Odu and Okonko, 2012).

There are thirty two staphylococci species of which *Staphylococcus aureus* is the most important member due to its association with infection and intoxication (Bergdoll, 1989). *S. aureus* also known as "golden staph" or Oro staphira is facultative anaerobic, Gram-positive cocci in cluster bacteria. It is a pathogenic organism because it possesses variety of virulence factors that allow it to attach to host cells, invade tissues and evade the host's immune system (Freeman-Cook, 2006). *S. aureus* causes the following infections in human: superficial infection (skin abscess, boils, and impetigo) and also invasive infection causing osteomyelitis, arthritis, endocarditis, pneumonia or septicemia.

S. aureus acts as endogenous reservoir for clinical infections in the colonized individual but also as a source of cross-colonization for community spread (Pathak et al., 2010; Odu and Okonko, 2012). Healthy individuals have a small risk of contracting an invasive infection caused by *S. aureus,* but they can be carriers of the organism (Foster, 2004; Odu and Okonko, 2012). The spread of colonization occur especially in close contact areas like schools, pre-schools or households (Peacock et al., 2003), probably by the contaminated hands and surfaces (Pathak et al., 2010; Odu and Okonko, 2012).

Among its mechanism of infection is the production of enterotoxins. Staphylococcal enterotoxins are group of proteins produced by *S. aureus* that induce an emetic response in humans along with other gastrointestinal symptoms (Freeman-Cook, 2006). They are capable of producing serologically different enterotoxins as well as variety of enterotoxin-like substances that are capable of causing severe illness in humans (Thomas *et al.*, 2007).

Many of the thermal processes used in foods are severe enough to kill any vegetative cells of *S. aureus*, but their enterotoxin have been shown to maintain their activity even after these processes e.g. milk

pasteurization. Illness due to staphylococcal intoxication is usually acquired through ingestion of contaminated foods that contain preformed toxins and is the third most common cause of food poisoning in the world (Atanassova *et al.*, 2001).

A variety of studies have examined community prevalence of carriage of *S. aureus* in diverse sub-populations, such as adult outpatients, health care workers, college students, and injection drug users (Wertheim et al., 2004; Bischoff et al., 2004; Bassetti et al., 2004; Eveillard et al., 2004; Mainous et al., 2006; Odu and Okonko, 2012). The prevalence of *S. aureus* ranges from 20% to 45%, with an estimate of methicillin-resistant *Staphylococcus aureus* (MRSA) colonization from 10 community surveillance studies of 1.3% (Salgado et al., 2003; Mainous et al., 2006; Odu and Okonko, 2012).

The prevalence of *S. aureus* in healthy populations are 20.0% in nasal cavity of students in Kano state, 36.0% and 40.0% in women's urine in two centres in Nigeria, 17.3% in nasal cavity of Turkish children and 32.4% in nasal cavity of adults in USA (Onanuga et al., 2008). The prevalence of *S. aureus* in infection are 43.7% in conjunctivitis among children in University College Hospital (UCH), Ibadan (Adeyeba *et al.*, 2010), 67.9% in UTI of children with nephritic syndrome in Kano (Adeleke and Asani, 2009) and 22.8% in Urinary tract infection at University of Benin Teaching Hospital (UBTH), Benin City (Akortha and Ibadin, 2008).

The incidence of community-acquired and hospital-acquired *S. aureus* infections has been rising with increasing emergence of drug-resistant strains called methicillin-resistant *S. aureus* (Fluit et al., 2001; Deresinski et al., 2005; Mainous et al., 2006; Odu and Okonko, 2012). MRSA is an established pathogen in most health care facilities. Previously limited to hospitals, MRSA infections have been increasingly reported in the community (Naimi et al., 2003; Nguyen et al., 2005; Harbarth et al., 2005; Ma et al., 2005; Ochoa et al., 2005; Mainous et al., 2006; Odu and Okonko, 2012). Because many clinical infections arise from spread from a healthy carrier, an understanding of the risk factors for carriage of *S. aureus* is crucial to understanding the potential for invasive infections and transmission of MRSA; however, most surveillance of *S. aureus* and MRSA has focused on individuals with invasive infections rather than on an entire population (Harbarth et al., 2005; Ma et al., 2005; Ochoa et al., 2005; Mainous et al., 2006; Odu and Okonko, 2012).

Few studies, however, have focused on which individuals are most likely to be colonized with *S. aureus* and which are most likely to specifically have MRSA (Mainous et al., 2006; Odu and Okonko, 2012). The aim of this study therefore, was to screen isolates of *Staphylococcus aureus* for methicillin-resistant and enterotoxin production.

2. MATERIALS AND METHODS
2.1. Study area and Sample collection
Clinical specimens of blood, ear, eye, finger, vaginal, nail, palm, throat, urethral, urine, semen, and wound swabs were collected from Government Healthcare centres in Lagos Central District, Lagos State, Nigeria and transported to the Immunology unit, Microbiology Division, Nigerian Institute of Medical Research, Yaba, Lagos for microbiological analysis.

2.2. Isolation of *S. aureus* strains
Samples of blood, urine, semen, ear, eye, finger, vaginal, nail, palm, throat, urethral and wound swabs were inoculated onto Mannitol Salt agar (MSA) and Staphylococcus agar (SA) plates. The cultured plates were incubated aerobically at 37^0c for 24 hours. Discrete colonies of *S. aureus* isolates from these clinical specimens were stored in 30% glycerol in Tryptone Soya broth and kept at-20^0C.

2.3. Identification of *S. aureus* strains
The stored isolates in broth were sub-cultured onto and incubated aerobically at 37^0C for 24 hours. Colonies identifiable as discrete onto the Muller Hinton agar, Mannitol Salt agar and Staphylococcus agar were carefully examined macroscopically for cultural characteristics. All isolates were subjected to various morphological characterization and gram stained to determine their gram reaction. Biochemical tests were carried out as described by Jolt *et al.* (1994) to determine the identity of the *S. aureus* isolates with reference to Bergey's Manual of Determinative Bacteriology. The isolates were identified by comparing their characteristics with those of known taxa, as described by Jolt *et al.* (1994) and Cheesbrough (2006).

2.4. Detection of Methicillin
All confirmed *S. aureus* isolates were sub-cultured on Muller Hinton Agar incubate at 37^0c for 24hours. After which a discrete colony was streaked out on CHROMagar^{TM} MRSA agar (CHROMagar) and incubate aerobically at 37^0C for 24hours. *S. aureus* isolates were screened for methicillin resistance by the disk diffusion method of the National Clinical and Laboratory Standards Institute (CLSI, 2006). Overnight cultures from *S. aureus* were subcultured on Mueller-Hinton agar, and a 1-µg oxacillin disk was placed on the inoculated plate. Zone diameters were measured and recorded after a 24-hour incubation at 37°C; the results were classified as sensitive ($\geq$ 13 mm), intermediate (11–12 mm), or resistant ($\geq$ 10 mm).

2.5. Detection of staphylococcal enterotoxins

Staphylococcal enterotoxins were detected using the RIDASCREEN® SET Total kit (r-biopharm). *S. aureus* isolates from Muller Hinton Agar were introduced into 1ml Brain Heart infusion (Oxoid) and incubate at 37°C for 18-24 hours to ensure optimal formation of enterotoxins. After incubation, cultures were centrifuged at 3500g for 5minutes at room temperature and placed on ice-pack immediately after spinning. Each supernatant wasaspirated into a clean sterile tube and assayed immediately for enterotoxin antibody. The required numbers of microtiter strips were inserted into the ELISA micro-wells holder. With the first well used as blank, 100μl of positive and negative controls were added successively followed by the supernatants. The plate was covered with adhesive paper and incubated at 37^0C for 60 minutes. One in twenty dilution of the wash buffer was prepared and using ELISA washer 100μl of the wash buffer solution was used to wash the micro-wells, the procedure wasperformed four more times. The plate holder was tapped gently on paper adsorbent to remove excess fluid, 100μl of substrate were added to all micro-wells except blank well, cover with adhesive tape and incubate at 37^0C for 60 minutes thereafter the washing step was performed. 100μl of conjugate were added to all micro-wells and incubate at room temperature in the dark for 15minutes. 100μl of the Stop solution were added and read at 450/630nm using ELISA reader.

2.6. Detection of specific staphylococcal enterotoxins

Filtrates of the RIDASCREEN® SET Total (r-biopharm) positive samples were screened for specific enterotoxins using RIDASCREEN® SET A, B, C, D, E (r-biopharm), following manufacturer instructions. The supernatants were used and possible because the tests were between 24 hours of each other.The required numbers of microtiter strips were inserted into the ELISA micro-wells holder. With the first well used as blank, 100μl of positive and negative controls were added successively followed by the supernatants. The plate is covered with adhesive paper and incubated at 37^0c for 60minutes. One in twenty dilution of the wash buffer was prepared and using ELISA washer 100μl of the wash buffer solution was used to wash the micro-wells, the procedure was performed four more times. The plate holder was tapped gently on paper adsorbent to remove excess fluid, 100μl of Conjugate 1 were added to all micro-wells except blank well, cover with adhesive tape and incubate at 37^0c for 60minutes thereafter the washing step was performed. 100μl of Conjugate 2 were added to all micro-wells except blank well and incubate at 37^0c for 30 minutes and the plate was washed. 100μl of substrate/chromogen were added to each well, blank well inclusive and covered. The plate was incubated at 37^0c for 15minutes, 100μl Stop solution were added and read at 450/630nm using ELISA reader.

2.7. Data Analysis

The carriage rates of *Staphylococcus aureus* was calculated by using positive samples as numerator and the total numbers of samples used in this study as denominator. The data generated from this study were presented using descriptive statistics. The data was subjected to Fisher's Exact Test for comparison of proportions to determine any significant relationship between carriage rate and different clinical specimens. Confidence level was set at p= 0.05. Prevalence of *S. aureus* enterotoxins, MSSA and MRSA were estimated with 95% confidence intervals. All the variables were adjusted for clinical specimens and agar. A complete case series analysis was used. The independent variables included were: isolates (MSSA versus MRSA), enterotoxins (single versus multiple) and agar (MHA versus SA). Chi-square tests were used to test for statistical significance (5%).

3. RESULTS ANALYSIS

Eighty three (83) *S. aureus* isolates were obtained in this study, of which *S. aureus* was most predominant in semen and blood culture [19(22.9%)]. This was followed by high vaginal swab (HVS) with eleven (13.3%) isolates. Ear, eye, throat and urethral swabs had the least prevalence [2(2.4%)]. Of the 83 *S. aureus* isolates obtained in this study, 43(52.0%) were identified as coagulase-positive *S. aureus* (CPSA). The distribution pattern of *S. aureus* isolates in the various clinical samples was shown in Table 1. The highest prevalence of CPSA isolates occurred in ear and urethral swabs (100.0%). This was followed by wound swabs (89.0%), urine (75.0%), HVS (55.0%), palm, throat and finger swabs (50.0%) and semen (37.0%). Eye and nail swabs had zero prevalence of CPSA (Table 1).

Table 1: Distribution of *Staphylococcus aureus* and coagulase-positive *Staphylococcus aureus* (CPSA) obtained from clinical samples

Samples	No. Tested (%)	No CPSA positive (%)
Semen	19(22.9)	7(37.0)
Ear Swab	2(2.4)	2(100.0)
Eye Swab	2(2.4)	0(0.0)
Throat Swab	2(2.4)	1(50.0)
Urethral Swab	2(2.4)	2(100.0)
Wound Swab	9(10.8)	8(89.0)
Urine	4(4.8)	3(75.0)
HVS	11(13.3)	6(55.0)
Finger	4(4.8)	2(50.0)
Nail	5(6.0)	0(0.0)
Palm	4(4.8)	2(50.0)
Blood	19(22.9)	10(53.0)
Total	**83(100.0)**	**43(52.0)**

Table 2 shows the distribution of methicillin-resistant *S. aureus* (MRSA) and methicillin-sensitive *S. aureus* (MSSA) isolates. Of the 43 CPSA isolates, 22(51.0%) were identified as MRSA while 21(49.0%) were MSSA. All the CPSA isolates from semen and urethral swabs were MSSA while all the CPSA isolates from the ear and throat swabs were MRSA. The highest number of isolates that were MRSA was obtained from wound swabs while least number of MRSA were isolated from finger, palm swabs and urine samples (Table 2).

Table 2: Distribution of methicillin-resistant *S. aureus* (MRSA) and methicillin-sensitive *S. aureus* (MSSA)

Samples	No. of CPSA (%)	MRSA (%)	MSSA (%)
Semen	7(16.3)	0(0.0)	7(100.0)
Ear Swab	2(4.6)	2(100.0)	0(0.0)
Throat Swab	1(2.3)	1(100.0)	0(0.0)
Urethral Swab	2(4.6)	0(0.0)	2(100.0)
Wound Swab	8(18.6)	7(87.5)	1(12.5)
Urine	3(6.9)	1(33.3)	2(66.7)
HVS	6(13.9)	5(83.3)	1(16.7)
Finger	2(4.6)	1(50.0)	1(50.0)
Palm	2(4.6)	1(50.0)	1(50.0)
Blood	10(23.3)	4(40.0)	6(60.0)
Total	**43(100.0)**	**22 (51.0)**	**21 (49.0)**

Key: CPSA – Coagulase positive *S. aureus*

Table 3 showed the distribution of enterotoxins in coagulase positive *S. aureus*. Six (60.0%) coagulase-positive *S. aureus* of the 43 tested for enterotoxin possessed single enterotoxins while 4 (40.0%) possessed more than one type of enterotoxin. Coagulase-positive *S. aureus* from wound swab had highest number of positive enterotoxins antibodies. One of the blood culture isolate was positive for single and multiple enterotoxins.

Table 3: Distribution of enterotoxin in CPSA

Source of *S. aureus*	CPSA isolates (%)	No. Positive (%)	Single (%)	Multiple (%)
Ear Swab	2(4.6)	1(50.0)	1(100.0)	0(0.0)
Wound Swab	8(18.6)	6(75.0)	3(50.0)	3(50.0)
HVS	6(13.9)	2(33.3)	2(100.0)	0(0.0)
Blood	10(2.3)	1(10.0)	0(0.0)	1(100.0)
Total	**43(100.0)**	**10(23.3)**	**6 (60.0)**	**4 (40.0)**

Key: CPSA – Coagulase positive *S. aureus*

None of the single enterotoxin isolates was positive for enterotoxin A and B while Enterotoxin D was the highest enterotoxin detected from Coagulase positive *S. aureus*. Enterotoxin C, D and E was detected from coagulase-positive *S. aureus* obtained from wound swabs (Table 4).

Table 4: Sample distribution of enterotoxin (single) in CPSA

Samples	No. of CPSA	Enterotoxins				
		A	B	C	D	E
Ear Swab	2				1	
Wound Swab	9			1	1	1
HVS	10				2	

4. DISCUSSION

S. aureus is a common cause of bacteraemia in the community especially as a nosocomial infection. In this study, 83 *S. aureus* isolates were obtained, of which *S. aureus* was most predominant in semen and blood culture [19(22.9%)]. This was followed by high vaginal swab (HVS) with eleven (13.3%) isolates. Ear, eye, throat and urethral swabs had the least prevalence (2.4%). Also, of the 83 *S. aureus* isolates obtained in this study, 43(52.0%) were identified as coagulase-positive *S. aureus* (CPSA). The highest prevalence of CPSA isolates occurred in ear and urethral swabs (100.0%). This was followed by wound swabs (89.0%), urine (75.0%), HVS (55.0%), palm, throat and finger swabs (50.0%) and semen (37.0%). Eye and nail swabs had zero prevalence of CPSA. Odu and Okonko (2012) showed that 32.0% of apparently healthy students of University of Port Harcourt, Nigeria below 30 years of age had *S. aureus* out of which 37.5% were MRSA. The 52.0% prevalence reported for *S. aureus* in this study is not comparable to the 32.4% reported by Mainous et al. (2006) and the 32.0% reported by Odu and Okonko (2012).

Numerous studies conducted in different countries and in different populations of patients on dialysis have consistently documented that a large proportion of such patients carry *Staphylococcus aureus* in their skins, nares and that the risk of them becoming infected with their own strains is quite high (Herwaldt, 1998; Odu and Okonko, 2012). Studies have been done in adults in intensive care units (Majumder et al., 2001; Anupurba et al., 2003; Saxena et al., 2003; Rajaduraipandi et al., 2006; Pathak et al., 2010; Odu and Okonko, 2012) and among patients at high risk of *S. aureus* infection (Chacko et al., 2009; Pathak et al., 2010; Odu and Okonko, 2012) but studies on prevalence of nasal carriage and antibiotic susceptibility pattern of *S. aureus* in children are few (Ramana et al., 2009; Chatterjee et al., 2009; Pathak et al., 2010; Odu and Okonko, 2012). One possible explanation of high prevalence of *S. aureus* in resource rich countries could be low rates of exposure to antigens due to better personal hygiene leading to decreased clearing of pathogens in the tested patients (Sivaraman et al., 2009; Pathak et al., 2010). However, transmission of infections caused by these strains is readily established by close contact (Xander et al., 2006; El- Jalil et al., 2008). Furthermore, transmission from humans to animals (Seguin et al., 1999) or from animals to man (Juhász-Kaszanyitzky et al., 2007) may further complicate the epidemiology of these organisms (El- Jalil et al., 2008).

This study showed that methicillin-resistant *S. aureus* (MRSA) isolates had higher prevalence (51.0%) than and methicillin-sensitive *S. aureus* (MSSA) with prevalence of 49.0%. All the CPSA isolates from semen and urethral swabs were MSSA while all the CPSA isolates from the ear and throat swabs were MRSA. The highest number of isolates that were MRSA was obtained from wound swabs while least number of MRSA was isolated from finger, palm swabs and urine samples. The 51.0% prevalence reported for methicillin-resistant *S. aureus* in this study is higher than the 17.9% in Loeffler *et al.* (2005) study. The result indicated MRSA, as common nosocomial pathogens of human. Ramana *et al.* (2009) reported a prevalence of 16.0% for *S. aureus*, of which 19.0% were MRSA among school going children (5 to 15 years) in Narketpally, Andhra Pradesh, India. Other study by Chatterjee *et al.* (2009) using polymerase chain reaction (PCR) showed a prevalence of 52.5% for *S. aureus* of which 3.9% were MRSA. They identified living in mud-thatch housing as factor associated with nasal carriage in their study (Pathak et al., 2010; Odu and Okonko, 2012).

Carriage of MRSA or MSSA varies in different geographical areas (Madani et al., 2001; Abudu et al., 2001; Sa-Leao et al., 2001; El- Jalil et al., 2008; Odu and Okonko, 2012). The prevalence of MRSA in some countries is still low. In the Netherlands for example, it is as low as 1.0% (Lytkainen et al., 2004; El- Jalil et al., 2008; Odu and Okonko, 2012). The prevalence of

MRSA among *S. aureus* isolates in the study by Mainous et al. (2006) was 2.58%, for an estimated population carriage of MRSA of 0.84%.

Ten coagulase-positive *S. aureus* were positive for enterotoxin production, a prevalence of 23.0% which is lower than what was observed in North Palestine (41.2%). The prevalence was in the ranges of 17.8% to 86.6% recorded by Adwan et al. (2006). The differences in prevalence observed might may be due to differences in ecological origin of the strains, sensitivity of detection methods, genes being detected and number of samples. Humphreys *et al*. (1989) found that enterotoxin production was higher among blood culture isolates of *S. aureus* from septicaemic patients.

5. Conclusion

This study may be useful in that our findings point out that all enterotoxin producing *S. aureus* were found to be methicillin resistant. Majority of the methicillin-resistant *S. aureus* were not enterotoxins producer. Therefore, all *S. aureus* isolated from the Laboratory specimen especially from wound specimen should be tested for enterotoxin. Detection of methicillin-resistant should be incorporated into the routine susceptibility testing for bacterial isolation especially for *S. aureus*.

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The Essential Skills for Teachers in Third millennium era

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Abstract: Third millennium has been called the age of information and knowledge era. The most important function of education is past, the memories and increase data transfer, nowadays it has an important role. The answer to this question: Are there educational methods to respond in the new century? If not, what changes are needed in order to be regarded as an efficient system of education? Development of teaching skills is the most important factor in successful teaching. Today, the teachers need for special skills, the purpose of this paper is to review specific training skills such as: 1- new technology; 2- Communication; 3- action research; 4- Creativity 5- The use of active teaching. The skills of the teacher are to change traditional patterns of learning at different levels. Consequently, successful people are being trained for the future.
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1. Introduction

Ignoring the rapid growth of technology on human society is impossible. Today, the rapid development of new technologies has transformed many aspects of our lives. For example, it can be pointed to changes in communication methods, economics and commerce. In this regard, there has been considerable progress of technology and changes in the education sector of the teaching-learning process.

Currently, the new skills needed for the workplace is essential to the use of technology in schools and classrooms. This practice has affected the traditional structure and culture of schools. Development of teaching skills is the most important factor in successful teaching.

Teachers need not only formal education but also support educational institutions need to learn to use technology in teaching. Teachers must change Classroom from static mode - in which the flow of information from teacher to student - to dynamic way that with this student is centered learning.

1.1. Expression Problem

Education is essential in meeting the challenges of the future. Teachers are the most important factor in successful teaching purposes and no amendment shall be made without the cooperation and active participation of teachers. Robert Marzino also implies that Physics teacher, a student or learner. Skilled

Teachers are skilled students. This conception of the teacher education process is significantly different from traditional views about the teacher.

For useful teachers need to fundamentally change in pre-service and in-service training of teachers and also monitors the work of teachers and get qualifications and certification. According to the above the question is that what are the skills required of teachers in the era? This paper describes the skills to improve the status of teachers (Fullan, M., & Hargreaves, A. (1991).

1.2. Importance of work

The future needs of the people that they have ability to understand the relationships and characteristics of this time and they are active and creatively to achieve the required knowledge. Since the most important objectives of education, talent and creativity of students is flourishing.

It is expected that along with the development of information and communication technology, teachers and the educational system will upgrade. Therefore, all teachers have the skills required to gain the knowledge era so they deliver to skilled people in the society.

1.3. Research in this field:

"Kuban" in 1924 and 1986 found that researchers often fail due to technological innovations have been attributed to the inability of teachers to adjust their teaching methods to maximize the potential of these innovations. The need for teacher is his professional skills.

Each type of neglect in obtaining the skills causes loss of work. Without investigation we can see that teachers are not enough practical skills. Many teachers have sufficiently high scientific knowledge, but they cannot use their professional

skills. And conversely, there are teachers who may have little knowledge, even in their own specialized fields, but the work of the teachers are very well (Schamber, S. (1999).

1.4. The Skills required of teachers in the era of knowledge

In the era of knowledge through new information technologies in educational institutions, homes and schools in particular, has revolutionized the interaction between teacher and student (Saphier, J., Haley-Speca, M., & Gower, R. (2008). Meanwhile, teachers need new skills that can be divided into five main categories:

1. Introduction of new technology
2. Communication
3. Research
4. Creativity of the teacher
5. Active teaching methods

In this paper, we introduce the features of these skills.

1.4.1. Introduction of new technology

Development of education in a way that is not responsive enough to the traditional tools.

Educational Association is global. The international networks of information are necessary for the utilization of new technology. Therefore, teachers should try to make use of new technology. ICT application in education, teachers is faced with new challenges. They should not only learn the skills to use ICT, but also learn how to design new guidelines for the integration of ICT into the curriculum.

In most cases, the quality of learning, information and communication technology (ICT) is undesirable. This is for those who need to have more education, are more problematic.

The teacher has a central role in the implementation of ICT based teaching strategies; in particular, the gap between the various educational. Thus, the motivation of teachers and the lack of information, it will have a negative impact.

Therefore, teachers should be trained in the field as soon as.

1.4.2. Communication

To succeed in school and become lifelong learning, students should increase their scientific capacity. The teacher's skills, especially communication skills, can be effective. The following are examples of communication skills:

1. Empathically
2. Collaborate with managers and other colleagues
3. Reception of problems
4. Exercise objectives and long-term perspectives

5. Description of interests and competencies
6. Resist
7. The responsibility of
8. Consult Vulnerability
9. Accept its mistakes
10. Patiently waiting

1.4.3. Action research

Action Research is a research that It helps us to wherever we do, we can do the job better and more useful.

If the action research is done correctly, the following results are: personal development, professional skills development, organizational improvement in the workplace and the effective role in the social system. Now we see this truth that on the verge of the twenty-first century, the abundance of Education requires to inquiring teachers that they tried to create some theories of their own activities and to revise their theories in practice. In the end, it will become conscious active.

These research activities, which are based on operational feedback, should be improved to between what is and what. In action research, teachers will engage in problem. Teachers are actually inhibited all stages of the research and thus reconstruction their professional skills. Results of research activities only are used in practice. It can be seen in the classroom, on the playing area, the library, the laboratory, the school environment and whether at home or other places (Ontario Ministry of Education. (2004).

Their Sensory receptors have used the tools of learning, observation, participation, interviews through open-response method. In describing the results, make use of "why" and "how to".

To quote one of the authors ((Just do not look to the exterior surface of the water iceberg, But also they see its real size or the size of the hidden underwater.

Lindariov in his book entitled "In Search of atmospheric dispersion" writes: (I am not the teacher who I began teaching Ten years ago. My class this year is very different from what it was last year. I'm always in favor of such a change).

1.4. 4. Creativity of the teacher

The most important principle to provide the motivation and creativity of the students, this is that the teacher is a creative individual, till   to be able to attract the attention of students to classroom activities and curriculum. If teachers adjust the curriculum according to students' opinion and in lessons learning attention to individual differences can better attract to recognize the interests of their students and their respect. Creative teacher will review the student's mood and discovered that this problem realizes what

they like. He tries to encourage students to entrust to the responsibilities and activities to the proper use of their learning happen in the classroom and outside the school environment. Teachers need to change the learning environment and classroom to the experimental environment, experience and ingenuity until students to find opportunities for innovation and creativity (Chappuis, J. (2005).

Creative teachers are not bound Creative teachers are not bound to follow any particular pattern of students to follow any particular pattern, But also to provide the sense of freedom and security in the classroom, will offer a creative context for their individual.

1.4.5. Active teaching methods
In today's conditions, the extent of the available data is inconsistent with a person's ability to use; the teacher should not be the sole reservoir of knowledge to speak and to transmit information but he must try to increase their students' thinking and reasoning skills and guide them from Memorizing the material into thinking and teach appropriate solutions that is based on learning with thinking.

According to what was said, Teachers should try to create conditions in the classroom in which students learn and to act according to its teachings. Teaching is not talking but it is an external process that involves a series of activities that could accelerate implementation what was learned. In this case, there is no doubt that they will learn more and better content.

The attention of students to teachers in different school age should not exceed 20 minutes and the rest of classroom time, students are doing other activities. Socrates was the first who noted to active teaching methods.

In his view, information and knowledge resides within individuals and teachers must find it. Not to transmit information to the people.

"Jerome Bruner", Contemporary American Scientist, One of the proponents of active teaching methods, inventor of exploratory learning method believes that: To respond directly to students, they will rely on books and teacher and Makes to do not an effort. Therefore they do not get satisfaction from learning and their learning incentive will be weak.

2. Recommendations:
-Improvement of teacher training institutions and acquaint teachers with the challenges of the present and future world:
According to statistics, more than half of the job of the future will be new jobs. Therefore, teachers should understand the jobs of the future and also mental health problems and the training of

astronauts before a flight out of the atmosphere, to train students for the future.
- Creating a system in which teachers have a role in making decision coupled with democracy. Teachers must feel that he can change the rules of education.
When the teacher is unable to coordinate their work environment and society,
How can train society in the future?
- Teachers must be adapted quickly to new teaching methods and use of new software.
- Increased levels of confidence in their students
- The use of individual and group techniques in the agenda.
In the era of knowledge, Teachers must have come from research and the use of research in their program.

3. Discussion
The Informed teacher, before any type of training will be based within their work and a rational approach to know that the learner how to learn and how could he via the skills to facilitate their learning. In other words, we must understand the principles and theories of learning as well.

The teacher should have a procedure in a dynamic and ever-evolving understanding of the principles and is associated with data centers, communications and scientific findings continuously. On the other hand, another part of the building to identify the learner's and they are what characteristics, How have the prerequisites for any learning and what is their level of motivation and willingness to learn a particular topic? The teacher cannot do without having this information, choice specific techniques for teaching.

When scientists such as Avicenna and Biruni were fluent in all of their time and all of it was collected in a book; but now that we have been in an era of information explosion, every moment of the volume is increased, how can no skills taught a small part of the science.

Moreover, how can we do away children from accessing inappropriate information?
And to learn that he also called to produce new information. It seems that Solutions, equipping teachers have a variety of skills.

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【1-9】。宇宙的加速膨胀可能是由于在早期我们宇宙黑洞与另一宇宙黑洞之间的碰撞和合并所造成的.

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【内容提要】：在1998年，由美国加里福里亚大学的劳仑斯伯克莱国家实验室的Saul Perlmutter教授和澳大利亚国立大学的Brain Schmidt所分别领导的两个小组，通过对遥远的Ia型超新星爆炸的观测，发现了我们宇宙的加速膨胀现象。他们指出那些星系正在加速地离开我们。[3] **现在，主流科学家们认为我们宇宙的加速膨胀是由于宇宙中存在具有'排斥力和负能量的神秘的暗能量'所造成的。**其中一些科学家们正为获得以后的诺贝尔奖而努力寻找这种暗能量。特别是，<u>我们宇宙诞生于137亿年前，那时暗能量并没有随宇宙诞生而出现，而暗能量却是在大约87亿年前蹦出来的。</u>.[3] **究竟什么是暗能量呢？现在还无人知道。**中国科技大学物理学<u>李淼</u>教授就幽默地说过:："有多少个暗能量的学者，就能想像出多少种暗能量"。[3] 那么，，我们宇宙的加速膨胀就只能用具有排斥力和负能量的神秘的暗能量来解释吗？这种解释的依据合理吗？本文的目的在于，按照黑洞的原理和其本性，论证任何一个黑洞的膨胀产生于吞噬外界的能量-物质和与其它黑洞的碰撞，它所吞噬的能量-物质愈多愉快，就膨胀得愈快。**对我们宇宙的加速膨胀现象，作者试图用一个宇宙黑洞和另一个宇宙黑洞在其早期的碰撞和合并来解释。虽然本文中的论证可能相对地简单，但也许比现有的其它各种理论更为合理和合乎实际。**

【关键词】：宇宙黑洞；宇宙的加速膨胀；暗能量；有排斥力或有负能的暗能量；宇宙黑洞的碰撞和合并；多宇宙；

【1】。我们宇宙早期的加速膨胀证实了多宇宙真实存在的可能性。

1998 年新近的观测表明，宇宙的加速膨胀并不是随宇宙的诞生而出现，而是在宇宙诞生后约 50 亿年才蹦出来的。如果由于所谓的'暗能量'的出现造成了宇宙的加速膨胀，**这就清楚地表明'暗能量'不是我们宇宙所固有的，**<u>而是来自我们宇宙的外界，即外面的宇宙。这就是多宇宙存在的强有力的证据。</u>况且，"近来，在我们的宇宙空间，发现了许多超巨型黑洞，**一个超巨型黑洞的质量约等值于$(10^7\sim10^{12})$ M$_0$--太阳质量。**据此计算，该黑洞的平均密度 ≈ 0.0183g/cm^3 "。这些超巨型黑洞往往处于星系的核心地位，其中或许会有一些恒星及其行星系统存在于黑洞内的边缘，而这种黑洞的外围还可能有太多的能量-物质可供吞噬使其不断地长大。或许十多亿年之后，就可能有智慧生物出现在其内的某些行星上。而他们将无法知道他们本黑洞外的世界。这就是说，甚至在我们同一个宇宙不同星系内，不同的超巨型黑洞内的智慧生物之间也无法互通信息。因为<u>每一个黑洞就是一个完全独立的宇宙。幸好我们的太阳系现在不在银河中心的超级黑洞内（银河中心黑洞太小，不可能存在恒星形象系统）。否则，我们连整个银河系都无法知道，更不会知道我们现在整个的宇宙了，</u>

可见，**我们宇宙内各超巨型黑洞之间的关系，是和我们宇宙与其它宇宙之间的关系是一样**的。因

为**我们宇宙一直就是一个真实的超级巨无霸黑洞。**[1] 上述在我们宇宙中的超巨型黑洞可吞噬其外面的能量-物质，或与其它的黑洞相碰撞。同样的道理，**我们这个宇宙黑洞也会吞噬我们宇宙外的能量物质或很可能和其它宇宙黑洞发生碰撞。**<u>由此可以推论，在我们宇宙这个真正的巨无霸黑洞内，除了有许许多多星系核心的超级黑洞外，广大的宇宙空间还套着许多恒星级黑洞。那么，在我们宇宙黑洞之外，也许有比我们宇宙黑洞更大更多的黑洞一层一层地套着或者平行的存在着。</u>只是由于受宇宙年龄和黑洞视界的限制，我们看不见而已。同时，我们宇宙在生成时，总质量的尺寸只有现在一个原子直径大小 10^{-13}cm 的"宇宙包"，当时同时生成的一定会有许多大小不同的其它的"宇宙包"像葡萄株一样生成，不可能只生出一个唯一的我们'宇宙包'。**原初多'宇宙包'的存在可能会造成后来我们宇宙黑洞与其它宇宙黑洞之间的碰撞和合并，这才是多宇宙的真实概念。**

美国北卡莱罗纳大学教堂山分校理论物理学家劳拉·梅尔辛·霍顿（the U.S. University of North Carolina at Chapel Hill, theoretical physicist Laura Mersin Horton）早在 2005 年, 她和卡耐基梅隆大学的理查德·霍尔曼教授提出了宇宙辐射存在异常现象的理论，并估计这种情况是由于其他宇宙的重力吸引所导致。今年 3 月，欧洲航天局公布了根据普朗克天文望远镜捕捉到的数据绘制出的全天域宇宙

微波背景辐射图。这幅迄今为止最为精确的辐射图显示，目前宇宙中仍存在 138 亿年前的宇宙大爆炸所发出的辐射。霍顿在接受采访时说：<u>"这种异常现象是其他宇宙对我们宇宙的重力牵引所导致的，这种引力在宇宙大爆炸时期就已经存在。这是迄今为止，我们首次发现有其他宇宙存在的切实证据。"</u>[2]

【II】. 暗能量是怎样提出来的。 任何对宇宙加速膨胀解释的理论，必须符合我们宇宙平直性的要求和当今较准确的观测值($\Omega = 1.02 \pm 0.02$)。而只有本文后面用黑洞之间碰撞合并的解释才符合此要求。'有排斥力的暗能量'和所有其它理论都解释不了我们宇宙的平直性。

爱因斯坦的广义相对论场方程如下：

$TG\mu\nu = 8\pi GT\mu\nu + \Lambda g\mu\nu$ [4]　　　(2a)

$G\mu\nu$ 是描述时空几何特性的**爱**因斯坦张量。$T\mu\nu$ 是物质场的能量-动量张量。$\Lambda g\mu\nu$ 是宇宙学项。其中 Λ 被誉为宇宙学常数。$\Lambda g\mu\nu$ 具有排斥力，它是**爱**因斯坦为了保持我们宇宙中引力和斥力的平衡，后来才加进去的。[4] 为了便于分析，$T\mu\nu$ 可分为下面三项：

$T\mu\nu = T^1\mu\nu + T^2\mu\nu + T^3\mu\nu$　　　(2b)

按照当今的较准确的观测和理论计算，<u>**$T^1\mu\nu \approx 4\% \ T\mu\nu$,**</u> [3] **$T^1\mu\nu$ 代表可见的有引力的普通物质**，如星星、星际间物质等。根据对许多星系旋转速度分布的观测和理论计算，<u>**$T^2\mu\nu \approx 22\%T\mu\nu$，**</u> [3] i.e, $T^2\mu\nu \approx (5 \sim 6) \ T^1\mu\nu$。 $T^2\mu\nu$ 代表有引力的不可见的星系中的暗物质。<u>**$T^3\mu\nu \approx 74\% \ T\mu\nu$,**</u> [3] 它就是 除 $(T^1\mu\nu + T^2\mu\nu)$之外的能量或者或所谓的暗能量，<u>它们与 $(T^1\mu\nu + T^2\mu\nu)$ 一起的总量必需能保持我们宇宙的平直性和 $(\Omega \to 1)$, 即$\Omega = \rho_r / \rho_o \approx 1$,</u> 因为Guth 和 Linde所提出的宇宙暴涨论的预言以及宇宙动力学均要求，宇宙的平直性 $\Omega = \rho_r / \rho_o \approx 1$是必须的，也就是要求宇宙的实际密度 ρ_r必须极为接近其临界密ρ_o。<u>近来，许多较准确的观测已证实$\Omega = 1.02 \pm 0.02$,</u> [4] 而较好地符合理论的要求，当然，**这里所提到的暗能量是指具有有引力的暗能量，而与近来科学家们所提出的'具有排斥力的暗能量'概念是不相同的和相反的。**

然而，为了解释新近对遥远的Ia型超新星爆发所发现的宇宙的加速膨胀现象，主流科学家提出了一些新理论，他们将 $(T^3\mu\nu + \Lambda g\mu\nu)$合并到一起成为$\Lambda g\mu\nu$，**认为 $\Lambda g\mu\nu$ 就是 $(T^3\mu\nu = 74\%T\mu\nu)$，而具有排斥力的未知的和神秘的暗能量。新理论最著名的代表是量子场论。**在该理论中，把 $(T^1\mu\nu + T^2\mu\nu = 0)$当作真空状态，或者说是最低能量状态或量子场的基本态。[4] 也是微观宇宙的零点能。而将宇宙中 $(T^1\mu\nu + T^2\mu\nu \neq 0)$的宏观能量物质即普通物质作为量

子场的激发态。对宇宙真空状态的观测到是非常符合于 $(T^1\mu\nu + T^2\mu\nu) = 0$。于是，将**$\Lambda g\mu\nu$ 正好作为具有排斥力的$T^3\mu\nu$的真空能，用于解释新发现的宇宙的加速膨胀。**不幸的是，按照量子场论所计算的$\Lambda g\mu\nu$值比在真空中实际的观测值要大10^{123} 倍（该数值来源于：现在宇宙的真实密度约为$10^{-30}g/cm^3$, 再加上按照**J. Wheeler**等估算出真空的能量密度可高达$10^{93} \ g/cm^3$）。由于这种原因，用量子场论解释爱因斯坦的广义相对论场方程就会遇到无法克服的困难。

很显然，**由**量子场论所计算出来的如此庞大的真空能量值，是无法保持宇宙的平直性和使张量 $G\mu\nu$ 在爱因斯坦的广义相对论场方程中与实际的观测值相符合的。**量子场论似乎把真空能量当作 "无限大的免费午餐"， 在宇宙中任何一点究竟储藏有多少真空能量和能被取出来多少? 为什么从真空中出来的负能量不和宇宙中现有的正能量发生湮灭? 如何使74% 的具有负能的暗能量 $\Lambda g\mu\nu$保持宇宙的真实的平直性?** 用量子场论解决上述问题就难免不违反宇宙的根本规律—因果律。由此可见，任何新理论，包括量子场论在内，**如要恰当的解释我们宇宙的加速膨胀，就必不可违反宇宙现有的平直性。**而且要使Ω 比当今的准确的观测值 $(\Omega = 1.02 \pm 0.02)$[4]还要准确，难以哉。

其实许多科学家和一些观测并不支持存在 "神秘暗能量" 或 "有排斥力的暗能量"。意大利国家核物理研究所的里奥托称："宇宙的加速膨胀不需要神秘的暗能量，它只不过是被忽略的大暴涨后的膨胀效应"。[5] 。

欧洲航天局的XMM牛顿天文望远镜的科学家们，观测到了炽热气体在古老星系团和年青星系团中的比例是一样的，他们认为只有宇宙中不存在暗能量才能解释这种现象。[6]然而, 现今 $(T^1\mu\nu + T^2\mu\nu)$的总量是太少了，不足以维持宇宙的平直性和使宇宙的实际密度 ρ_r极为接近其临界ρ_o。因此，**$T^3\mu\nu /T\mu\nu \approx 74\%$ 是维持宇宙的平直性所必需的'正能量'。** 所以，这里的$T^3\mu\nu$应当是那些未被观测到的和看不见的而有正能的暗能量或物质才对。[1][3][4]

在2007年1月8日，一个美国科学研究小组宣称，经过几年的努力，他们首次绘出了我们宇宙暗物质的三维图。他们指出，在我们宇宙，大约有1/6是可见物质，**其余的80%以上都是暗物质.** [7] <u>他们实际上否定了暗能量的存在。</u>

近代宇宙学通常将宇宙学项并入物质场的能量-动量张量，这就相当于引进一个能量密度的能量-动量分布，即 $\rho\Lambda = \Lambda/8\pi G$, 或者 $p\Lambda = -\Lambda/8\pi G$。[4] 因而**近代宇宙学从引进 $\rho\Lambda$ 和 $p\Lambda$ 已经实际上认为热能的排斥力是宇宙中引力的天然的对抗者。因此, 近代宇宙学是无需'有排斥力的暗能量'的。但是如果**

每个能量-物质粒子都有不同的热抗力，方程就无法解出。**所以这仍然只是一个物理概念。**

【III】。黑洞 M_b 在其视界半径 R_b 上的 4 个参数 M_b, R_b, T_b, m_{ss} 的 5 个普遍公式，他们的变化决定了黑洞生长衰亡的规律。[1]

以下只研究无电荷、无旋转和球对称的引力(史瓦西)黑洞。**不管黑洞内部状态和结构有多么大的差别和复杂，4 参数必须服从下面的 5 个公式，这是黑洞的本质属性。**

黑洞质量 M_b 在视界半径 R_b 上的 5 个基本公式，

$$R_b = 2GM_b/C^2, \text{ 或 } R_bC^2/2G = M_b \text{ [9][11]} \quad (3aa)$$
$$T_b M_b = (C^3/4G) \times (h/2\pi\kappa) \approx 10^{27} gk \text{ [11]} \quad (3ab)$$

公式(3aa)是史瓦西对广义相对论的特殊解，是任何真正的引力黑洞或曰史瓦西黑洞存在的必要条件。(3ab) 是著名的霍金量子辐射 m_{ss} 在黑洞 R_b 上的霍金温度 T_b 的公式，(3ac)是霍金辐射 m_{ss} 在黑洞 R_b 上的能量转换的阀温 T_b 的公式是，

$$m_{ss}C^2 = \kappa T_b \quad (3ac)$$

根据(3ab)和(3ac)式，可得出黑洞在其视界半径 R_b 上最重要的一个(3ad)公式，

$$m_{ss} M_b = hC/8\pi G = 1.187 \times 10^{-10} g^2 \text{ [1]} \quad (3ad)$$

当黑洞 M_b 因不停地发射霍金辐射 m_{ss} 而收缩到极限时，即有 $m_{ss} = M_{bm}$，同时，因为普朗克粒子 **$m_p = (hC/8\pi G)^{1/2} g$ [8]**，所以下面的(3ae)式成立。

$$M_{bm} = m_p = m_{ss} = (hC/8\pi G)^{1/2} g = 1.09 \times 10^{-5} g \quad (3ae)$$

M_b--黑洞的质量，R_b--黑洞的视界半径，C—光速，M_θ—太阳质量，C--引力常数，h—普朗克常数，κ--波尔兹曼常数，4 个参数 M_b, R_b, T_b 和 m_{ss} 服从在 R_b 上的 5 个基本公式。所以，不需要考虑黑洞内部的结构和状态，只要定出其中任何 1 个参数的数值，黑洞在 R_b 上的上的其它参数值全都确定了。因此，从上面的 5 个公式看，黑洞 M_b 与其它性能参数 T_b、R_b、m_{ss} 之间的关系都是简单的单值的线性关系。可见，黑洞是宇宙中最简单的实体。

其次，由于黑洞 M_b 最后只能收缩成为最小黑洞 $M_{bm} = m_p$，即普朗克粒子。所以按公式(3aa)其最小的 $R_{bm} = 1.61 \times 10^{-33} cm$，而不是零，其密度也不可能成为无限大的'奇点'。这与解广义相对论方程所得出的黑洞会收缩成为'奇点'的结论是完全不同的。[1]

【IV】. 我们宇宙一直就是一个真实的巨无霸宇宙黑洞. 它完全遵从黑洞在其视界半径 R_b 上【III】节的 5 个公式，$\Omega \equiv 1$ 是宇宙黑洞的本性。
4-1*；我们宇宙现在的总能量-质量 $M_u = 8.8 \times 10^{55} g \approx 10^{56} g$

现代精密的各种天文望远镜实际的观测数据表明，我们宇宙球体具有精密而可靠的数据。第一；**我们宇宙真实靠的年龄 $A_u = 137$ 亿年**[1].[3] 于是，由此计算出，其视界半径 $R_u = C \times A_u = 1.3 \times 10^{28} cm$，密度 $\rho_u = 3/(8\pi GA_u^2) = 0.958 \times 10^{-29} g/cm^3$. 可得出宇宙现在的总质量 **$M_u = 8.8 \times 10^{55} g$**. 第二. Hubble 常数的实际的可靠的观测数值是 **$H_o = (0.73 \pm 0.05) \times 100 kms^{-1}Mpc^{-1}$ [3]**，由此算出宇宙的实际密度 $\rho_r = 3H_o^2/(8\pi G) \approx 10^{-29} g/cm^3$. 并得出宇宙年龄 $A_r^2 = 3/(8\pi G\rho_r)$，$\therefore A_r = 0.423 \times 10^{18} s = (134 \pm 6.7)$ 亿年，得出**宇宙的总质量 $M_r = 8.6 \times 10^{55} g$**. 由此可见，**两种不同的近代精确测量**数据所得出的结果几乎完全一致。

因此，为了计算方便，下面取我们宇宙现在的数据如下。 **取宇宙总质量 $M_u = 8.8 \times 10^{55} g$，宇宙年龄 $A_u = 137$ 亿年，视界半径 $R_u = 1.3 \times 10^{28} cm$，宇宙平均密度 $\rho_u = 0.958 \times 10^{-29} g/cm^3$。**

4-2*；证实我们宇宙 M_{ub} 是一个真正的宇宙黑洞；宇宙膨胀的 Hubble 定律就是宇宙黑洞吞噬外界能量-物质和其它黑洞合并而膨胀的规律。

1；证实如下：如果我们宇宙(M_{ub})是真正的宇宙黑洞，它应当是由宇宙大爆炸所产生的大量原始的最小黑洞 $M_{bm} = 1.09 \times 10^{-5} g$, $R_{bm} = 1.61 \times 10^{-33} cm$, $T_{bm} \approx 0.65 \times 10^{32} k$ 所合并而成 [1] 由公式(3aa)可知，取 M_{bm} 是组成我们现在宇宙 M_{ub} 的总数 N_{ub1} 是：

$$N_{ub1} = M_{ub}/M_{bm} = 8.8 \times 10^{55}/1.09 \times 10^{-5} = 8.073 \times 10^{60}. \quad (4a)$$
$$N_{ub2} = R_{ub}/R_{bm} = 1,3 \times 10^{28} cm/1.61 \times 10^{-33} cm = 8.074 \times 10^{60} \quad (4b)$$

由于 $N_{ub1} = N_{ub2}$, 由公式(3aa)可见，这就确凿地证明了我们宇宙是一个真正巨大的宇宙黑洞-- UBH. 我们宇宙黑洞 M_{ub} 的史瓦西 时间 t_{bs},

验证： $t_{bs} = R_{ub}/C = 1.3 \times 10^{28}/3 \times 10^{10} = 0.433 \times 10^{18}/(3.156 \times 10^7) = 137.3 \times 10^8$年

2; **宇宙膨胀的 Hubble 定律就是宇宙黑洞吞噬外界能量-物质和其它黑洞合并而膨胀的规律。**

将 Hubble 定律运用到我们宇宙球体的视界，
$$M_u = 4 \quad _o R_u^3$$
$$/3 = 4 \quad 3H_0^2/8 \quad G \quad C^3 t_u^3/3 = 4 \quad 3H_0^2/8 \quad G)$$
$$C^3 t_u/3H_0^2 = C^3 t_u/2G = \underline{C^2 R_u/2G} \quad (4c)$$

从史瓦西公式(1c), $2G M_b = C^2 R_b$,
$$M_b = R_b C^2/2 G = C^3 t_{bu}/2G = \underline{R_{bu}C^2/2G} \quad (4d)$$

现在由于 **$t_u = t_{bu}$, $R_{bu} = R_u$, $M_u = M_b$. 因此，(4c) = (4d)。** 从而再次证实我们宇宙是一个真正的宇宙黑洞，黑洞只有在吞噬外界能量-物质或者与其它黑洞合并才产生膨胀。因此 Hubble 定律所反应的宇宙质量随时间的增长而正比例增长的规律，正是黑洞吞噬外界能量-物质和其它黑洞合并时 R_{bu} 的膨胀规律。**什么时候 $t_u \neq t_{bu}$? 一旦黑洞吞噬完外界能量-物质，黑洞就会停止膨胀而发射霍金辐射 m_{ss}，而**

后以极其缓慢的速度减少其质量 M_b，此时 t_{bu} 和 **Hubble** 常数也几乎小到接近于 **0** 的负增长。于是宇宙年龄 $t_u \neq t_{bu}$，宇宙年龄 t_u 就会继续增长。

4-3*；宇宙的平直性， $(\Omega = \rho_r/\rho_o = 1)$ 是宇宙黑洞--UBH 的本性，
　　<u>因为宇宙作为一个黑洞，只有唯一的密度 ρ_{ub}，</u> 因此，其代表宇宙平直性的 $\Omega \equiv 1$ 就是必然的. 广义相对论折腾科学家们 50 年以上的弗里德曼模型其实是一个无法证实的伪命题。
　　按照哈伯定律，在我们宇宙，距离任何一点 P 为 R_p 的相对膨胀速度 V_p 为，H_o--哈伯常数，
　　$V_p = H_o R_p$ 　　　　　　　　　　　(4e)
　　从公式(3aa)和球体公式, 在黑洞视界上，当 R_p 延伸到 R_{ub} 时，$V_p = C$，于是，
　　$H_o{}^2 = 8\pi G\rho_o/3$ 　　　　　　　　　(4f)
　　<u>既然我们宇宙是一个真正的宇宙黑洞，它就必然是一个封闭的球体，它就只能有一个平均密度 ρ_{ub}。</u> 因此，ρ_o 就是我们宇宙黑洞理论上的临界密度。从公式 (3aa) 可知，它是单值，且仅由 M_{ub} 所决定。[1] 然而，宇宙的实际密度 ρ_r 也是来自观测同一个宇宙黑洞的 H_o，即 $H_o{}^2 = 8\pi G\rho_r/3$。<u>其必然结果是: ρ_r 应完全等于公式 (4f) 的 ρ_o。所以, $(\Omega = \rho_r/\rho_o \equiv 1)$，或者说，$\rho_{ub} = \rho_r = \rho_o$ 就是宇宙黑洞的本性。反过来，$\Omega = \rho_r/\rho_o = 1$ 也证明我们宇宙是一个真正的宇宙黑洞。</u>

4-4*； 既然我们宇宙 M_{ub} 来源于 $N_{ub1} \times M_{bm}$ 个宇宙出生时，N_{ub1} 个最小黑洞 M_{bm} 不断地合并所造成的膨胀，也就是说，<u>M_{ub} 的视界半径 R_{ub} 一直在以光速在膨胀</u>，这种结果与我们宇宙黑洞 M_{ub} 外有充分的能量-物质可供吞噬，以达到 R_{ub} 一直在以光速在膨胀个效果是一样的。这就成了。
　　$A_u = 137 \times 10^8 = t_{bc} = 137 \times 10^8$ 年 　　　(4g)
　　如现在我们宇宙黑洞 M_{ub} 外已经没有能量-物质可被吞噬，那么，$A_u > t_{bs}$. 而且，哈伯常数 $H_o = 0$。

4-5*；弗里德曼宇宙模型之所以谬误和不符合宇宙的实际情况， 是因为在解广义相对论方程时，为了使方程简化而易于求解，提出了许多错误的假设而造成的，如假定粒子无热抗力、等压、定量等都是违反热力学定律的。从而导致解广义相对论方程时出现'奇点'和和弗里德曼模型，认为 $\Omega = \rho_r/\rho_o \neq 1$ 等重大谬误。

【V】。黑洞视界半径 R_b 的膨胀速度 V_b 和加速度 a_b。

<u>黑洞是一个非稳定的非封闭系统，其最重要的本质属性就是不停地在吞噬外界能量-物质时膨胀或者在发射霍金辐射 m_{ss} 时收缩其视界半径 R_b。</u>
5-1*；黑洞在吞噬外界能量-物质或与其它黑洞碰撞后的膨胀规律。 一旦一个黑洞形成之后，不管它是因吞噬外界质能量而膨胀，还是因发射霍金辐射而缩小，在其最后成为<u>最小黑洞 M_{bm} = 普朗克粒子 m_p，而解体消失在普朗克领域之前，<u>他会永远是一个膨胀或者收缩的黑洞。</u></u>
　　按照史瓦西对广义相对论方程的特殊解(3aa)，
　　$R_b = 2GM_b/C^2$，　　　　　　　　　(3aa)
　　$\therefore C^2 dR_b = 2G dM_b$ 　　　　　　　(5a)
　　$\therefore C^2(R_b \pm dR_b) = 2G(M_b \pm dM_b)$ 　　(5b)
　　假设有另一个黑洞 M_{ba} 与黑洞 M_b 合并或碰撞，而另一黑洞 $C^2 R_{ba} = 2GM_{ba}$，于是，
　　$\therefore C^2(R_b + R_{ba} \pm dR_b) = 2G(M_b + M_{ba} \pm dM_b)$ 　**(5c)**
　　结论: 1；从公式 (5c) 和(5a)相比较后可见，一旦一个黑洞形成后，不管它是增多或减少其质量，甚至与其它黑洞相碰撞合并，在它最后收缩成为最小黑洞 $M_{bm} = 10^{-5}$ g 而消失在普朗克领域前，<u>它将永远是一个黑洞。</u>[1] 2。由于黑洞只有在发射霍金辐射 m_{ss} 时才会收缩，但是一般黑洞的 m_{ss} 非常微弱，而且发射的极慢，所以，此时 R_b 的收缩是极慢的。从公式(5a) (5b) (5c) 可知，当黑洞因吞噬外界能量-物质或者与其它黑洞碰撞合并时，其 M_b，R_b 增大，再按照 (3ab) 和 (3ad) 式，T_b，m_{ss} 必定降低减小。相反，当黑洞外界无质能吞噬而向外发射霍金辐射 m_{ss} 时，M_b，R_b 减小，而 T_b，m_{ss} 增加，直到最后收缩成为最小黑洞 $M_{bm} = m_{ss}$ --霍金辐射时，才解体消失在普朗克领域。[1]

5-2*；当黑洞 M_b 吞噬外界物质-能量或与其它黑洞合并时，由公式(3aa)可知，M_b 会快速增加，其视界半径 R_b 随着产生膨胀速度 V_b 和加速度 a_b。
　　$R_b = 2GM_b/C^2$，或者 $R_b C^2/2G = M_b$ 　　(3aa)
　　$dR_b = (2G/C^2)dM_b$ 　　　　　　　(5a)
　　$dR_b/dt = (2G/C^2)dM_b/dt$ 　　　　　(5d)
　　令黑洞 R_b 的膨胀速度 V_b，
　　$V_b = R_b/dt$ 　　　　　　　　　　(5e)
(3d)$dR_b/dt = (2G/C^2) dM_b/dt$
(3e)令黑洞视界两对面的相对膨胀速度，$V_b = dR/dt$，
　　$\therefore V_b = (2G/C^2) dM_b/dt \leq C$ 　　　　**(5f)**
　　<u>结论：1；在一般情况下，显然 $V_b < C$。2*。</u> 在 $dR_b/dt = C$ 的膨胀速度为极限条件下，即<u>当 $dt = 1$ 秒时，$dM_b/dt = 2 \times 10^{38}$g/sec,</u> 这相当于每秒吞噬外界物质达到 $10^5 M_\theta$(太阳质量)。所以，每一个黑洞，无论其质量 M_b 是多少，<u>只要每秒能够吞噬到外界能量-物质达到 $10^5 M_0 = 2 \times 10^{38}$g/sec，其视界半径 R_b 就会以光速 C 膨胀。2*。</u>不要小看这 $dt = 1$

秒的时间, 我们宇宙诞生于最小黑洞 M_{bm} = m_{ss} = m_p =1.09×10⁻⁵g, 其史瓦西时间仅为 10⁻⁴³ 秒, 当宇宙成长到 1 秒时, 它已增长了 10⁴³ 倍, 因而宇宙的质量 由 M_{bm}=1.09×10⁻⁵g 增加到 10⁻⁵g×10⁴³ = 10³⁸ 克, 这正是上面 dM_b/dt = 2×10³⁸g/sec 的数值。**3;** 当黑洞外界无能量-物质可吞噬时, 黑洞会不停地向外发射霍金辐射 m_{ss}, M_b 会不停地减少, 直到最后变成为最小黑洞 M_{bm}= m_p =1.09×10⁻⁵g 在普朗克领域解体消亡。[1]

5-3*。令黑洞视界半径膨胀的加(或减)速度 a_b = dV_b/dt,

$$a_b = (4G/C^2)d^2M_b/dt^2 \qquad (5g)$$

(5g)表明黑洞视界的加(或减)速膨胀 a_b 正比例于其每秒吞噬外界物质 M_b 的增加或减少速度。

因此, 黑洞吞噬外界能量-物质所造成的加(或减) 速膨胀是其正常的活动的表现和结果。

【VI】. 分析和论证我们宇宙的加速膨胀(AEOU)是由于两大宇宙黑洞在其早期的碰撞所造成的.

在分析我们宇宙的加速膨胀 时, 我们是根据下述的事实和情况作一步一步的分析和推论的。

6-1*；1998 年, 科学家们根据遥远的 Ia 型超新星爆炸, 发现我们宇宙的加速膨胀是发生在宇宙大爆炸之后的约 50 亿年之后, 即距今约 87 亿年之前, 那是在宇宙演化中的物质占统治地位的时代。在我们宇宙黑洞内, 星系、星团、恒星、大小黑洞等早已经形成.

6-2；根据(5c) 式可知, 无论 1 个黑洞与其它黑洞的碰撞合并, 或者是吞食外界的能量-物质, 总是小黑洞 M_{bs} 被吸进大黑洞 M_{bb} 内吞噬 M_{bb} 的能量-物质而变大, 也就是说, 是小黑洞 M_{bs} 吞噬完大黑洞 M_{bb} 的能量-物质后变成二者合一的更大黑洞(M_{bs} + M_{bb}), 而不是大黑洞 M_{bb} 消化掉小黑洞 M_{bs}。**因为宇宙中没有任何一种力量可以将任何一个黑洞内部的能量或物质吸拉或取出来, 也不可能将一个黑洞分割成若干个。** 同时按照黑洞的本性, 黑洞只有在发射霍金辐射时才收缩变小。但是一般黑洞的霍金辐射是非常非常地微弱的, 比电子和电磁波都微弱。所以, 在宇宙中, 都是小黑洞吞噬大黑洞内的能量-物质而变成大, 因为外面的那些能量-物质都比小黑洞发射出去的霍金辐射大的多多, 在吞噬完所有能量-物质后, 最后二者的视界半径重合为一, 而变成(R_{bs} + R_{bb})大黑洞。

6-3*；小黑洞 M_{bs} 与大黑洞 M_{bb} 合并时, M_{bs} 的视界半径 R_{bs} 的膨胀速度 V_{bs} 和加速度 a_{bs} 的变化情况。

当 2 黑洞 M_{bs} 和 M_{bb} 的视界半径 R_{bs} 和 R_{bb} 尚未接触时, 二者都不可能将对方内部的能量或物质吸进或拉进到自己的内部以增加自己的质能量 M_b 和 R_b。**因此各 R_b 不会产生膨胀速度和加速度, **只能产生 M_{bs} 和 M_{bb} 互相靠拢的速度和加速度。

一旦 2 黑洞接近到其 R_b 开始接触时, 小黑洞 M_{bs} 就开始从大黑洞 M_{bb} 内吸入能量-物质, 因为 M_{bb} 内的能量和物质粒子的温度和质量都大于 M_{bs} 的霍金辐射 m_{ss}, 于是 M_{bs} 和 R_{bs} 开始增加, 其膨胀速度 V_{bs} 和加速度 a_{bs} 从零开始增加, 随着 M_{bb} 被 M_{bs} 吸入进去的能量-物质愈多愉快, V_{bs} 愈大和 a_{bs} 就愈快。如果 M_{bb} 足够大, 到 M_{bs} 完全进入 M_{bb} 后, 如果 M_{bb} 内还有足够多的质能被 M_{bs} 吸入, 则 R_{bs} 的膨胀速度 V_{bs} 将有可能达到光速 C, a_{bs} 就达到最大值。此后, M_{bs} 或将以 V_{bs} = 光速或常数吸完 M_{bs} 内所有能量-物质, 最后形成一个新的大黑洞(M_{bs} + M_{bb}), 其新的视界半径为(R_{bs} + R_{bb}), 此后 a_{bs} = 0。如果新大黑洞外尚有能量-物质可被吸进, 则(R_{bs} + R_{bb})还会有膨胀速度 V_{bs}(如果外部能量-物质足够充足, V_{bs} 可能达到光速 C), 和加或减速度±a_{bs}, 直到吞噬完外面所有的质-能, 而后向外不停地发射霍金辐射而收缩, 最后收缩成 m_p 而消亡。

**6-4*；根据如上所述, 可以想像, 约 87 亿年前, 即我们宇宙小黑洞 M_{ub} 与另外一个宇宙大黑洞 M_{ubb} 开始接触合并的情况, **由于 M_{ub} 的视界半径 R_{ub} 外能量-物质可能已非常稀少, 其膨胀速度 V_{ub} 在接触前趋近于零。M_{ub} 与大黑洞 M_{ubb} 开始接触时, M_{ub} 的 R_{ub} 开始膨胀而产生膨胀速度 V_{ub} 和加速度 a_{ub}, 它们从零开始而快速增大, 直到不久 M_{ub} 完全进入大黑洞 M_{ubb} 后, 由于 M_{ubb} 非常巨大, 而且当时都处在宇宙演变和膨胀的早期, M_{ubb} 的能量-物质非常丰富, 密度也比现在高得多, 因 R_{ub} 之外的 R_{ubb} 内有足够多能量-物质可被吞噬, 因此, 其膨胀速度可达到 V_{ub}= C 光速而膨胀到现在, 此时加速度 a_{ub} = 0。由于现在我们宇宙黑洞 M_{ub} 的 R_{ub} 仍然在以光速 C 在膨胀, 证明 R_{ub} 外界都还有大量的能量-物质可被吞噬。但是, R_{ub} 的外界究竟还有多少能量-物质, 因在视界 R_{ub} 之外, 我们无法知道。如果一旦 M_{ub} 吞噬完 R_{ub} 之外的所有的能量-物质后, R_{ub} 就不会再膨胀, 人们此时可以测量出哈勃常数等于零。此后, 我们宇宙黑洞 M_{ub} 就开始向外不停地发射霍金辐射 m_{ss}, 经过极其漫长的时间之后, M_{ub} 最后会收缩成为普朗克粒子 m_p = 最小黑洞 M_{bm} 而消失在普朗克领域。于是, 在极其广大而寂静的宇宙空间, 只有充满着了无生气的 m_{ss} 辐射能。

6-5*。究竟现在我们宇宙黑洞 M_{ub} 的 R_{ub} 之外可被吞噬的能量-物质是有限还是无限的呢？ 最近的天文观测似乎给出了答案。

最近，据 2013.5.21 日报道，美国宇宙学家们表示，他们根据欧洲普朗克天文望远镜观测到的数据，从宇宙背景辐射图发现在某小块处有不均匀的迹象，证明我们宇宙黑洞外有另一个平行的宇宙(作者暂时称之为 M_{ubb1})存在，它的引力使我们宇宙某部分的微波背景辐射产生异常。[2]果然如此，二者的引力正在使它们彼此走向靠拢接近，从而终会再次发生碰撞和合并。这是多重宇宙论的首个"切实证据"。

同时，这也表明我们宇宙黑洞 R_{ub} 之外的空间里，可被吞噬的能量-物质是有限的。而且会在不太远的将来，**不管我们宇宙黑洞 M_{ub} 是否能吞噬完其 R_{ub} 之外的所有能量-物质，那个在我们宇宙黑洞之外的另外一个宇宙黑洞 M_{ubb1} 总会与我们宇宙黑洞 M_{ub} 碰撞合并的**，从而将会再次导致我们宇宙 R_{ub} 的一次新的加速膨胀。如果 2 个宇宙黑洞在碰撞时，M_{ubb1} 比我们 M_{ub} 小，M_{ubb1} 就会进入我们 M_{ub} 内部，然后会像绞肉机一样，将我们 M_{ub} 内的所有物质绞成粒子，如果那时我们宇宙黑洞 M_{ub} 内还有人类，就会被 M_{ubb1} 绞碎。如果我们 M_{ub} 比 M_{ubb1} 小，M_{ub} 就会进入 M_{ubb1} 的内部，绞碎所有 M_{ubb1} 内所有的物质，最后变成为一个新的大黑洞（M_{ub} + M_{ubb1}），其视界半径为（R_{ub} + R_{ubb1}）。如果 M_{ubb1} ≈ M_{ub}，2 者内部的能量和物质可能造成激烈的碰撞混合后成为一个新的大黑洞 $2M_{ub}$ = $2M_{ubb1}$。无论发生那种情况，都需经过漫长的时间，人类的寿命与其相比，那是太短促了

【VII】。由上节所描述的 2 个宇宙黑洞 M_{ub} 和 M_{ubb} 在我们宇宙 M_{ub} 诞生后的 50 亿年时的碰撞合并过程，现在来看宇宙的物质和能量的分布情况。假设现在我们宇宙黑洞仍然被称为 M_{ub}。

我们现在宇宙的年龄是 137 亿年。假设我们原先的、未碰撞前的宇宙小黑洞为 M_{ubo}，它在 137 – 50 = 87 亿年前与另外一个宇宙大黑洞 M_{ubb} 开始碰撞合并，于是 M_{ubo} 就进入 M_{ubb} 内，吞噬其物质-能量。我们知道 M_{ubb} 的能量-物质在 M_{ubo} 外经过 R_{ubo} 被吞进的过程中，由于 R_{ubo} 外面的潮汐对物质的撕裂作用和粒子接近光速 C 的运动甚至互相的碰撞。结果，**进入到我们 M_{ubo} 内部的物质粒子可能有相当大的部分会转变为辐射能或者暗物质。但是 M_{ubo} 宇宙小黑洞内在与 M_{ubb} 碰撞前原来会有更多的物质比例。这可能就是我们现在的宇宙 M_{ub} 内大部分是能量而物质极少的原因。** 设原先的 M_{ubo} 在 M_{ubb} 内长大后，已成为我们现在的宇宙黑洞 M_{ub}。

从【VI】节可见，我们宇宙黑洞现在的质量为 M_{ub} = **$8.8×10^{55}$g, R_{ub} = $1.3×10^{28}$cm, ρ_{ub} = 0.958 $×10^{-29}$g/cm^3.**

上面已经说过，我们宇宙的年龄 A_u =137 亿年。在这 137 亿年内，宇宙几乎保持在等光速 C 而膨胀，虽然在 87 亿年前因与另外的宇宙黑洞的碰撞合并而有加速膨胀，相对宇宙年龄而言，为时很短。所以现在的 R_{bu} ≈ C×A_u，。再按照公式(3aa)，$R_bC^2/2G = M_b$，可得出我们宇宙的质量与其年龄成正比，即，

M_{ub} ∝ A_u (6a)

既然 2 黑洞的碰撞和合并发生在 87 亿年前，则 M_{ubo}/M_{ub} =(137– 90)/137 = 34.3%,   (6b)

R_{ubo}/R_{ub} = （137 – 90）/137 = 34.3%   (6c)

（$\Delta M_{ub} = M_{ub} - M_{ubo}$）/$M_{ub}$ = 65.7%   (6d)

所以，M_{ubo} = 0.343 M_{ub} = $3×10^{55}$g,

R_{ubo} = 0.343R_{ub} = 0.343×$1.3×10^{28}$ = **0.446×10^{28}cm。**

讨论： 从上面的计算可以看出一个非常有趣的问题。我们宇宙黑洞在 87 亿年前的质量 M_{ubo}= 34.3% M_{ub}，而 2 项物质(见【II】节)的 $T^1\mu\nu$ + $T^2\mu\nu$ = 26% $T\mu\nu$ ，即可见物质和星系中暗物质之和约为现在宇宙中总能量-物质的 26%。M_{ubo} 与（$T^1\mu\nu$ + $T^2\mu\nu$）相对的较接近。现在科学家们所测定的宇宙中的暗能量（暗物质）约为 $T^3\mu\nu$ ≈ 74% $T\mu\nu$ 。可见，ΔM_{ub} 与 $T^3\mu\nu$ 较接近。这几个百分数之较接近，是偶然的吗？使得人们不得不怀疑，**M_{ubo} 是否就是组成现今 $T^1\mu\nu$ + $T^2\mu\nu$ 的主要部分？而（ΔM_{ub} = M_{ub} - M_{ubo}）是否就是所谓暗能量 $T^3\mu\nu$ 的主要来源部分？** 我们知道，当一个宇宙黑洞 M_{ubo} 吞噬外界能量-物质和物体时，由于黑洞视界外对外界能量-物质和物体的潮汐作用，会将物质在吸积盘中绞碎。所以外界能量-物质和物体 ΔM_{ub} =（M_{ub} - M_{ubo}）经过黑洞视界进入黑洞后，可能有相当多的部分会变成暗物质和能量。那么，ΔM_{ub} =（M_{ub} - M_{buo}）是不是就是现在观测不到的暗物质和能量呢？这些比例数的接近是巧合吗？

【VIII】.几个简单的结论：

A；黑洞的膨胀。 小黑洞从接触大黑洞开始，吞噬大黑洞的能量-物质是从零开始而快速增多的，这是小黑洞开始与大黑洞碰撞接触直到完全进入大黑洞内部的过程，也就是人们观测到的小黑洞的视界半径 R_b 加速膨胀的过程。

B；我们宇宙原先的小黑洞 M_{ubo} = $3×10^{55}$g 在 87 亿年前与宇宙中的另外一个巨大的宇宙黑洞发生碰撞，产生了人们现在观测到的我们宇宙的加速膨胀。 而后我们小宇宙黑洞 M_{ubo} 进入那个大黑洞内部后继续吞噬其内部的能量-物质而使其视界半径 R_{ubo}

以光速 C 膨胀，直到现在，成长为大黑洞 M_{ub}。宇宙黑洞原来的质量 M_{ubo} 是经过 50 亿年后由 M_{bm} =$1.09×10^{-5}$g 增加到 M_{ubo} = $3×10^{55}$g 的，再经过 87 亿年后，M_{ubo} 增加到现在的 M_{ub}= $8.8×10^{55}$g。

C；我们现在宇宙黑洞 M_{ub} 的命运。如果 M_{ub} 外无能量-物质可被吞噬，那么 M_{ub} 将会不停地向外发射霍金辐射 m_{ss}，M_{ub} 也会不停地收缩，直到最后收缩成为最小黑洞 M_{bm}= m_p = $1.09 ×10^{-5}$g 而在普朗克领域爆炸消失，其寿命按照霍金的黑洞寿命公式 $\tau \approx 10^{-27} M_b^3$ (s) $\approx10^{133}$ 年。但是现在哈勃常数仍然正常，表明 M_{ub} 外不知还有不少的能量-物质，而 M_{ub} 只有在吞噬完外界的所有能量-物质后，才会收缩，直到最后收缩成为最小黑洞 M_{bm} =$1.09×10^{-5}$g 而在普朗克领域消失，其寿命将>>10^{133}年.

D．我们宇宙黑洞 M_{ubo} 在 87 亿年前与 M_{ubb} 的碰撞合并，以及未来的可能与另外一个宇宙黑洞的碰撞合并都是各平行宇宙黑洞之间的碰撞合并，究竟有多少个平行的宇宙？诸多平行的宇宙是否都被包容套在一个个更大层次的大宇宙内？还是说，就只是存在大量的平行宇宙，而没有包容一些平行宇宙的更大层次的大宇宙？恐怕人类永远也无法知道这种问题。毕竟人类的寿命比起宇宙来是太短了。

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====全文完====

The New Explanations to The Accelerating Expansion of Our Universe: It Might Originate From The Collision And Combination Between Two Cosmic Black Holes 8.7 Billion Years Ago

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【**Abstract**】。According to the theories and nature of black holes, this article aims to demonstrate that, the expansion of any black hole must originate from the collision and combination between two black holes or from engulfing in the energy-matters from its outside; the more and the faster energy-matters could be engulfed in, the faster the black hole would expand. Therefore, the accelerating expansion of our Universe might be explained with the collision and combination between two comsmic black holes in their earlier period, because our Universe must have been the one of the really cosmic black holes in the unlimited Cocmos. Although the demonstrations in this article may be rather simple, but they are probably more reasonable.

【**Key Words**】。Cosmic black holes; the accelerating expansion of our Universe; dark energy; dark energy of exclusive force; the collision and combination between two universal black holes; multi-universes;

====The End====

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Adaptation of Gordon Pask Learning Style Inventory into Turkish

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Abstract: In this study, linguistic equivalency, validity and reliability studies of Gordon Pask Learning Style Inventory were carried out and the inventory was adapted into Turkish. The study was conducted on 725 students (412 female, 313 male) majoring in various departments in Faculty of Education at N.E. University. The inventory is composed of 22 items with 6 Likert type choices. Content and construct validity studies were made as a part of validation study. Expert views were taken for content validity of the learning style inventory and construct validity was determined with factor analysis. For the reliability of the inventory, Cronbach Alpha coefficient and test-retest method were used. The Cronbach Alpha coefficient of the inventory was determined to be 0.78, and test-retest reliability coefficient was determined to be 0.99. As a result of analysis, it was concluded that Gordon Pask Learning Style Inventory is a valid and reliable measurement instrument.

Key words: learning style, validity, reliability, serialist-holist

1. Introduction

In recent years, the number of studies into the definition and determination of learning styles students prefer has increased (Brown, 1978, p. 307-309; Griggs & Dunn, 1984, p. 115-119). However, there are different approaches with regard to definition of learning styles. The reason for the diversity in these approaches is that they focus on different dimensions of learning (cognitive, affective and physiological). Models developed by Kolb, McCarthy and Gregorc can be given as examples of learning style models that consider cognitive dimension. Those developed by Silver and Hanson, Dunn and Dunn, and Curry set examples for learning styles in which affective dimension is considered and examples of learning style models which emphasize physiological dimension are Silver and Hanson, Dunn and Dunn and Curry learning styles (Ekici, 2001). Felder and Silverman Learning Style was developed in 1994 with science education in mind.

When relevant literature in Turkish is reviewed, it is seen that there are many studies into Kolb's learning styles (see Çağıltay & Tokdemir, 2004; Hasırcı, 2006; Tuna, 2008; Çaycı & Ünal, 2007). It is also seen that Witkin's field dependent/independent cognitive styles (see Altun, 2003; Demirkan, 2007; Somyürek & Yalın, 2007) and Dunn and Dunn's learning styles were also studied (Babadoğan, 2009). The interesting point is that there is not any study into Pask's Holist and Serialist styles in the literature in Turkish.

While Witkin studied filed dependent and field independent styles in the US, Pask studied on the same concept in the UK and called field dependent and independent cognitive styles as holist and serialist

(Ford, 2000).

Pask et al., (1972) conducted a series of experiments on the learning of academic topics by learners in various fields of study and observed that individuals employed one of the two basic approaches when learning (Ford, 2000; Ford & Chen, 2001). The individuals Pask call as holist are those who approach learning with a global approach. In the beginning of the learning process these individuals firstly try to grasp the connections between various topics and construct a large and conceptual framework in which they can later incorporate details. On the other hand, serialists who have a local learning style and tend to study one topic at a time focus on different topics separately and in sequence and then try to logically connect these topics to each other. For these people, the big picture is composed and emerges towards the end of the learning process (Ford, 2000). Individuals who Pask define to be versatile have both holist and serialist characteristics.

While serialists shuttle between theory and practice during the learning process, holists study either on theory or practice but if it is very necessary for learning, they bring theory and practice together towards the end of learning process (Ford, 2000; Ford, Chen, 2001; Ford et al., 2002). In short (Sadler-Smith & Smith, 2004, p. 402),

- Holist individual have global, top-down approach;they can do many things at the same time (simultaneous processing),
- Serialists have local, bottom-up approach; they do things in order (serial processing).

Being pathologically at the extreme points of holist and serialist styles (Entwistle, 1977, p. 233)

- causes holists to make decision in a stew in case of inadequate information,
- and causes serialists not to be able to have a point of view to see the whole picture.

In this framework, Gordon Pask's learning style inventory represents a theoretical model of how learners select and mentally employ information. In this context, the aim of this study is to adapt Gordon Pask Learning Style Inventory into Turkish. It is considered that the Turkish form of the learning style inventory can be used as an effective means of data collection.

2. Methodology
2.1. The Study Group

This study was carried out on a total of 725 university students, 412 of whom are female and 313 are male, majoring in different departments of Necmettin Erbakan University. 98 of the students studied at Biology Education department, 93 studied at the department of Pre-school Education, 97 of them studied at Turkish Language and Literature Education department, 142 of the students studied at Social Sciences Education department, 88 of them were at Science Education department, 103 students attended the department of Psychological Counseling and Guidance department, 55 students were majoring in Geography Education and 49 studied at the History Education department. Out of a total of 725 students, 53 of the students who volunteered for the second administration were given the test four weeks later for test-retest reliability. Besides, for language equivalency the inventory was administrated to 58 students attending the Foreign Language Education Department.

2.2. Means of Data Collection

Learning Style Inventory was developed by Pask (1976) to determine students' learning styles. The inventory devised to determine learning types includes a total of 22 items, 11 being in the first dimension (1.2.3.4.5.6.7.8.9.10.11) and 11 being in the second dimension (12.13.14.15.16.17.18.19.20.21.22). The inventory asks students to indicate their preferences with regard to each item on scale of six choices ranging from "Always" to "Never". High scores on the sub-dimensions were considered to be the indicator of learning style. The consistency values for the first and second sub-dimensions were found to be 0,77 and 0,82, respectively. In the reliability study, the test-retest consistency was found to be 0,99 for both the first dimension and the second dimension.

2.3. Procedure

When translating Pask's Learning Style Inventory into Turkish, we tried to choose the most suitable sentence structures and to provide meaningful translations of idioms and the most suitable Turkish equivalents of culturally foreign words as much as possible. To this end, the translation process of the inventory was carried out meticulously. The inventory was independently translated into Turkish by four experts who are competent in English. After these translated forms were examined, a tentative Turkish form of the inventory was formed. Later on, three experts were asked to examine the Turkish form of the inventory in terms of cultural context, linguistic, research methodology and assessment and evaluation criteria. In line with suggestions, corrections were made and the final Turkish form of the inventory was obtained. The form was then translated back into English by two linguists and education specialists who are good at English. The Turkish translation and the English translation forms were compared by two academics at the department of Foreign Language Education. The experts stated that the translated forms reflected the same ideas as the original form. For linguistic equivalency of Pask's Learning Style Inventory, a study group composed of 58 students at Foreign Language Education Department of Ahmet Keleşoğlu Faculty of Education in Necmettin Erbakan University, who were competent in both languages, was formed based on the academics opinions. The correlation between the scores on the English form and Turkish form of the inventory were regarded to be the indicator of linguistic equivalency. As a result of the study for linguistic equivalency of the inventory, the correlation between the English and Turkish form was found to be 0,99 for the first dimension, and for the second dimension it was determined to be 0,99. Explanatory and confirmatory factor analyses were applied to determine the dimensions of Pask's Learning Style Inventory. The internal consistency and test-retest reliability of the sub-dimension scores of the inventory were examined. SPSS 18.0 package software program was used.

3. Results
3.1. Validation Study

To test construct validity of the scale, Explanatory Factor Analysis and Confirmatory Factor Analysis were conducted. Data from 335 students (55% female, 45% male) were used for Explanatory Factor Analysis (EFA), and data from 390 students (54% female, 46% male) were used for Confirmatory Factor Analysis (CFA). To determine reliability of the scale, data from 725 students were used.

3.1.1. Explanatory Factor Analysis

In this study, EFA was conducted to reveal factor construct of the scale. Before EFA was conducted, the size of the sample and multivariate

normal distribution assumptions were checked. To test the size of the sample, Kaiser-Meyer-Olkin (KMO) coefficient was calculated and the KMO coefficient was found to be 0,823. It can be said that KMO values become more perfect as they get closer to 1, and are unacceptable if they are lower than 0.50 (Tavşancıl, 2005). Accordingly, the value was close to the perfect value. In the next stage, multivariate normal distribution assumption was checked. To this end, Bartlett test coefficient was calculated and it was seen that the ensuing coefficient was significant (X^2= 2179,89; p < 0,01). Accordingly, it was understood that multivariate normal distribution assumption was met as well. (Çokluk, Şekercioğlu, Büyüköztürk, 2010). Later on, EFA was performed. According to EFA results, it was revealed that the 22 items were clustered under two factors with eigenvalue larger than 1.The factor loads of the items under two factors were examined, it was understood that the factor loads of items 10 and 18 were lower than 0,30, and that items 4, 9, 15 and 17 were not under the same dimension as they were in the original form of the scale. Base on expert views, these items were omitted from the scale and EFA was performed again. The 16 items obtained as a result of the repeated EFA gathered under three factors with eigenvalue larger than 1. When scree plot graphic was examined, it was understood that there was a sharp decrease after the second factor and the eigenvalues of the following factors were quite close to each other (Figure 1). In line with this result and based also on expert views, it was decided that the scale should be of two dimensions and EFA analysis was performed again with the scale having two dimensions.
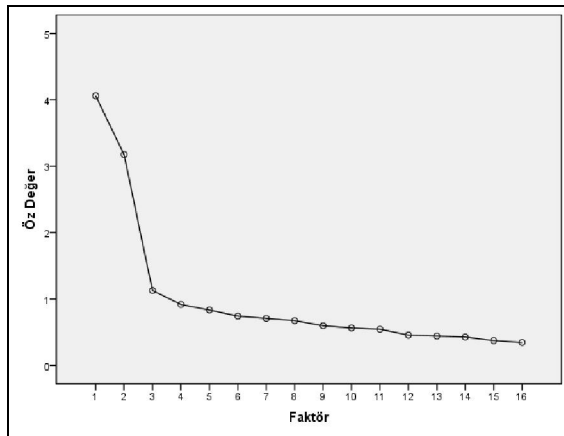

Figure 1. Scree plot Graphic As a Result of Explanatory Factor Analysis

Factor number and the percentages of the variances explained by the factors are briefly presented in Table 1. Accordingly, the eigenvalue of the first factor is 4,06 and the percent of the variance it

explains is 25,38, the eigenvalue of the second factor is 3,18 and the percent of the variance it explains is 19,85. These two factors together explain 45,23% of total variance.

Table 1. The Number of Factors in the Pask Learning Style and the Percent of the Variance They Explain

Factor	Eigenvalue	Variance Percentage	Summated Variance Percentage
1	4,061	25,383	25,383
2	3,175	19,846	45,228

According to the result of EFA, the factor loads of the items in the scale are summarized in Table 2. While the factor load values of the items in the first factor ranged between 0,732 and 0,442, the factor load values of the items in the second factor ranged between 0,769 and 0,582. As in the original scale, the items in the first factor measure holist learning style and the items in the second factor measure serialist learning style.

Table 2. Factor Loads of the Items in the Pask Learning Style Scale

The First Factor	Item No	Factor Load	The Second Factor	Item No	Factor Load
Holist	m1	0,686	Serialist	m12	0,728
	m2	0,672		m13	0,769
	m3	0,732		m14	0,616
	m5	0,590		m16	0,729
	m6	0,442		m19	0,587
	m7	0,724		m20	0,590
	m8	0,499		m21	0,717
	m11	0,719		m22	0,753

3.1.2. Results of Confirmatory Factor Analysis

As a result of EFA, the scale turned out to have a two dimensional structure. To test this emerging construct, CFA was employed. To this end, the scale was administrated to 390 students (54% female, 46% male) and the resulting data was submitted to CFA. As a result of CFA, to determine if the two-dimensional structure is compatible with data collected, the fitness indexes and Chi-square value with regard to the model were examined. Calculated modification fitness values were examined to obtain better fitness values and the correlations between the errors of some items were released (Figure 2). Modification indexes show the decrease in Chi-square value in case a constant parameter is added (released) or a new parameter is added (Sümer, 2000). The fitness values obtained for

the ultimate model are shown in Table 3.

Table 3. Statistical Values with Regard to Fitness of Structural Equation Model

Measurement	Good fitness	Acceptable fitness	Fitness values of the model
(X^2/sd)	≤ 3	≤ 4-5	1,590
RMSEA	≤ 0,05	0,06-0,08	0,039
SRMR	≤ 0,05	0,06-0,08	0,052
NFI	≥ 0,95	0,94-0,90	0,901
CFI	≥ 0,97	≥ 0,95	0,960
GFI	≥ 0,90	0,89-0,85	0,951
AGFI	≥ 0,90	0,89-0,85	0,934
TLI	≥ 0,95	0,94-0,90	0,952

According to Table 3, it is seen that the model with two factors has satisfactorily good fitness values (Meydan and Şeşen, 2011). The tested two factor model is shown in Figure 2. It is seen that factor loads of the items in the holist dimension of the model ranged between 0,38 and 0,68; the factor loads of the items in serialist dimension ranged between 0,47 and 0,70. The all ways in the model were found to be significant at 0,001 level.
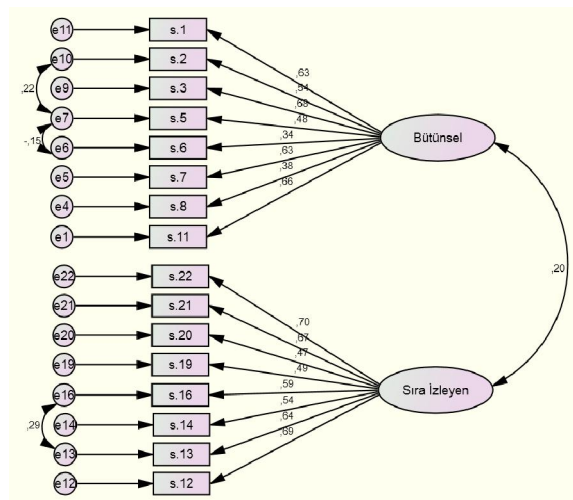

Figure 2. CFA results with regard to the Two Factorial Model n= 390, X2 = 159,046; sd=100 ; p< 0,001

3.2. Reliability Study

Data from 725 students were used for the calculation of the scale's reliability. The Cronbach Alpha reliability coefficients calculated for the whole scale, holist and serialist dimensions, were found to be 0.78, 0,77 and 0,82, respectively. Accordingly, it can be argued that the reliability of the scale is at acceptable level (Tavşancıl, 2005).

Besides, the reliability of the scale was also examined with test-retest method. To this end, the scale was administrated to 48 students with a 4-week interval and the correlation between the two administrations was calculated. Concordantly, each of the correlation coefficient calculated for the total score, scores from the first and second dimensions was fond to be 0,99. Accordingly, the reliability coefficient obtained with test-retest method can be said to be quite high.

4. Conclusion and Suggestions

This study aims to adapt Learning Style Inventory developed by Pask (1976) into Turkish. In the translation of the inventory into Turkish, experts who are competent in both English and German were included in the study. After the translation process, linguistic equivalency study for the Learning Style Inventory was performed and it was seen that the correlations was 0,96 for the 1st dimension and 0,95 for the 2nd dimension. These results indicate that the relation between German and Turkish forms of the inventory is at quite a good level and the Turkish translation of the items of the inventory comply quite well with original items in German.

As in the adaptation studies of other scales carried out in Turkey (see Dağhan & Akkoyunlu, 2011; Büyüköztürk et.al., 2004; Doğan & Çermik, 2012), some items were omitted from the scale because of cultural differences. The scale is composed of two dimensions as "holist" and serialist". The scale includes a total of 22 items, 11 being in the holist dimension and 11 being in the serialist dimension. As a result of factor analysis, all items in the original form of the scale were included in the scale; however, item 10 and 18 were omitted as their factor loads are lower than 0,30 and item 4, 9, 15, and 17 were excluded as they were not in the same dimension as in the original form scale. The two factorial structure was considered and in the analyses, the scale was limited with two basic factors to conform with the original form of the scale. The scale explains 45.23% of the total variance. These changes might be stemming from social, economic, cultural and geographical differences between the two countries. This point of view can pave the way for further studies.

To ensure the reliability of Pask's learning style inventory Cronbach alpha internal consistency and test-retest reliability coefficients were calculated. The Cronbach alpha internal consistency coefficient of the inventory was found to be 0.78, 0.77 and 0.82, which indicates that the items in the inventory are consistent with each other, that is the reliability of the scale is at satisfactory level. As a result of test-retest reliability study conducted with a four-week interval, the test-retest reliability of the inventory was found to be 0.99, which indicates that the scale had quite good values in terms of test-retest reliability.

As a result, Pask Learning Style Inventory was adapted into Turkish, linguistic equivalency study was made and some evidences indicating that the inventory is valid and reliable means of measurement to determine learning styles of university student were obtained.

In line with the findings obtained in this study, the following suggestions can be made for further studies: it is considered that the scale will contribute to researchers concerned with the concept of learning style; simultaneous fitness validity of Pask Learning Style Inventory with another learning style inventory can be examined.

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从特斯拉到生命泛旋量子
---《黄帝内经》量子人学（1）

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摘要：如果说人体类似一个黑洞物理和具有反德西特时空/共形场论的对偶性，那么《黄帝内经》是早把如今全息术延伸的三个原理方向，包含统一处理在内。对于人体处于4维时空的消化系统、神经系统、呼吸系统、循环系统、运动系统、内分泌系统、泌尿系统和生殖系统等8大系统的实体结构，《黄帝内经》多出的经络系统，实际是类似"降维"描述联络、组织、调和这8大系统的"黑洞"表面二维观控图。

关键词：量子簸场 黄帝内经 量子信息 经络

一、特斯拉的生命泛旋量子论

古中医和量子论有很多相似之处。把古中医和量子论的诞生过程联系作探讨，我们想到了尼古拉·特斯拉（1856-1943年）的引力动态理论。尽管特斯拉的这个理论从未正式发表过，但由于他对爱因斯坦研究有主张重力是一种场效应的评论，可知他是基于经典力学延伸而来的。这是特斯拉扩展牛顿的引力质量概念，提出宇宙中的天体，可视为一个个拥有电磁场的电容；遍布时空的电磁力，则促成旋转场，从而产生引力；在地面上所见到的所有机械运动，都是这种电磁力作用于一种类似于生命泛旋量子的介质之上而产生的。宇宙中的所有物质，大到银河系小到电子，都类似带有智能的有机生命体，能感觉到电子、电流、电磁的每一个微小的量子的意识。

这也含有一种"大量子论"，即先把正负、虚实的整个空间-时间都包括在内。

这是1937年81岁的特斯拉，发表了一份批评爱因斯坦的相对论的声明，引出他的引力动态理论的猜想。可他死前并没有公开发表过文章。引力动态理论最早的发轫，是1893至1894年他称，由电磁力产生的现象，是宇宙内最重要的现象。在此他的基本论点仅仅是："假设天体作用于周围空间并引起空间弯曲，我这简单的大脑里顿时浮现出一个结论，那弯曲的空间必然反作用于天体，产生相反的影响，矫正这弯曲。由于作用力与反作用力是同时并存的，那么假设的空间曲率是毫无可能发生的；即使它发生，也无法解释观察到的天体运动。只有力场的存在，才能解释其原因，而它的结论废黜了曲率空间论……"。此间正是西方"不情愿的量子革命"发轫的时期。

也许有人从特斯拉的此评论中得出，引力动态理论是旋转磁场模型的逻辑延伸，即机械运动是电磁力作用于媒介的一种普遍结果，它不考虑所谓的空间曲率。这里特斯拉的类似于生命泛旋量子的介质，相似于声波，由于速率、频率、共振、媒介、周边环境的不同，其特性也会变化多样。介质的电磁场从负极性中创造出吸引力（泛指引力），电磁效应产生旋转场，介质的缺席将导致不存在任何电磁力。特斯拉死后，由于美国联邦政府立刻收藏了他的大部分资料，理由是为阻止他的发明信息落入"敌人之手"，并宣布相关的资料被列为机密。所以目前尚不清楚是否有此理论的完整版本，以及是否被记录在特斯拉某篇论文中。

在特斯拉的引力动态论中，第一概念就是旋转，大旋转，小旋转；引力动态论中，不存在速度、时间，它们只是在一定旋转段中的假象。例如设宇宙是无限大，旋转从小到大也是无止尽的，每一个引力的诞生都会归附到旋转之上，成为重力场。即宇宙重力是整体的，速度、时间概念是在寄生之下的基础所产生的相对概念。

小旋转形成引力场，小旋转总和构成重力场，个体系统的"引力段"才有速度概念。即有大段与小段之分，最小的引力段速度必定略快于光速，直到衔接入重力场成为旋转。引力段消失，速度也消失。在同一系统的引力，小旋转可以通过大旋转而归附到该重力场上，因为没有速度，没有时间，且旋转运动产生变化，而变化才使我们感觉到时间存在的假象。因时间只是标记了这种变化，排除变化，时间就不存在，故而瞬间产生"坐标互换"，即为"空间传送系统"。

例如宇宙中所有物质都在运动，你认为光子速度很快，反过来光子认为你的速度很快。宏观上讲，整个宇宙有一个重力中心，重力中心对整个宇宙构建了唯一的重力场。这个重力场是固有的，绝对不会因为某个星系的位置改变而改变，因此不需要速度的概念。再说宇宙中一切都在旋转，从宇宙中心来看天体，天体都在旋转的重力场作用下旋转。以地球为例，地球在旋转的重力场作用下由西向东旋转，地球上所有物质都受到旋转重力场的作用。因此，地表下沉的流体在北半球应该是逆时针旋转，在南半球应该是顺时针旋转，如水漩涡、龙卷风等等。即重力是构成宇宙的盘石，引力则是各种小盘石，依此再形成各系统的重力场。之后产生的各种粒子及辐射，都是依附在这些盘石之上而得以寄生，直到整个宇宙的能量释放终了，辐射全部消失，但是宇宙重力却依旧存在，只是没有产生引力段的变化而无法起到作用。

特斯拉的旋转电磁场量子观念，以及系统的"引力段"有大段与小段之分，在同一系统的引力，小旋转可以通过大旋转而归附到该重力场上等观念，实际是对应今天量子论与大量子论的。这里的量子论与大量子论，只不过是在空间-时间上的整体、大小的分段。即它们之间有千丝万缕的联系，这正是量子态信息隐形传输的基础。量子态信息隐形传输要分为虚实两部分，即以相对论划界把量子论分为两部分：一是界于光速及亚光速的量子态信息传输，二是类似超光速的、永远看不见部分的量子态信息隐形传输。两者合起来才构成认知的信息，这类似人体的数千万细胞和各种器官，都是由一个受精的干细胞发展而来；这也正是古中医经络理论中类似"科幻"的基础。

特斯拉在世的整个时期，正是西方经典量子论的发生和发展时期。量子论虽然没有在中国诞生，但早在古中医经典著作《黄帝内经》一书中，也可见到西方量子论发轫和特斯拉科学研究方法的影子，中西合璧，特斯拉的"生命泛旋量子"耀然纸上。今天科学界之所以要重新审视特斯拉，理由也在如此。所以对有些把特斯拉的量子论与大量子论，中文翻译为"以太"的，并挑明和旧以太有区别，但我们也认为不妥，应翻译为"生命泛旋量子"。一是1949年新中国解放后，由于国家政治和科学的需要，通过对现代和古代物质无限可分的讨论，已走上"量子中国"的道路；二是改革开放后，国内已发表了不少有关"生命泛旋力学"和"量子簸场"的学术论文和著作。

1、特斯拉何许人也？

尼古拉·特斯拉（Nikola Tesla）1856年7月10日生于南斯拉夫克罗地亚的斯米良，1884年移居美国，在爱迪生的公司里工作。1893年他展示了无线通讯并成为了电流之战的赢家之后，就成为了美国最伟大的电子工程师之一而备受尊敬。

特斯拉还被认为是无线电遥控船、X光摄影技术、收音机、雷达、传真机、真空管、霓虹灯管、飞弹导航等约700多项专利的发明人。甚至以他名字命名的磁密度单位，更表明他在磁学上的贡献。但特斯拉的晚年极其不幸，而被世界遗忘。特别是1882年特斯拉继爱迪生发明直流发电机后不久，发明了交流发电机，并创立了多相电力传输技术，与此同时也促使很多赚钱的企业瞬间倒闭，因此爱迪生等人极力打压他。而特斯拉从不在意他的财务状况，他的梦想就是给世界提供用之不竭的能源。特斯拉终身未娶。1943年1月7日特斯拉在纽约的旅馆，孤独地死于心脏衰竭。

2、特斯拉与爱因斯坦对立吗？

特斯拉的悲剧有人说最主要的原因，是经济利益与他对立人的打压。如特斯拉为实现全球的无线输送电的抱负，筹建沃登克里弗广播塔，被后来马可尼先声夺人，抢先获得了无线电商业上的成功，因而欠了投资人摩根一屁股债。马可尼告美国政府包庇特斯拉，摩根也以自己的经济和政治手腕，下令美国所有学校课本删除特斯拉的名字，从而一直影响到现在。但也包括当时和今天支持他的一些人给他制造的障碍。

例如赞扬特斯拉反对相对论，说他能与当时蓬勃发展起来的量子力学格格不入。实际是他晚年想入非非，不切实际，因而不太受正统的科学团体的欢迎，甚至被斥为卖弄江湖妖术的骗子。而赞扬特斯拉反相对论的理由，是说爱因斯坦开辟的"以假设和数学演绎的方法"为主的电磁力和引力研究方向，被树立为权威和教条，是误导大多数电磁力和引力研究者的工作方向。但特斯拉不是在继承和发展爱因斯坦的成果，而是在立志反对基于假设和数学演绎的方法，树立"以观察和实验为主的方法"；由此他对电磁力和引力进行了广泛深入的研究，才做出了一系列的重要成果。

有人甚至把挑战总结为"质疑现有理论才能创新发展"的口号，并说成是，近年来在这种力量的推动下，世界才重新发现了特斯拉，且影响到中央电视台2009年6月16、17日的10套《人物》栏目，播放《科学"超人"尼古拉·特斯拉》的电视片，成为重新认识的重要起点之一。诚然从表面上看，特斯拉和爱因斯坦有各自的电磁力和引力研究。特斯拉当年以观察和实验为主的方法给出的研究成果和研究方向，与爱因斯坦当年以假设和数学演绎为主的方法给出的研究成果和

研究方向，二者是大不相同的。但特斯拉的以观察和实验为主的方法，在从《黄帝内经》成书到今天的中国，被埋没了吗？1937 年 81 岁的特斯拉批评爱因斯坦，爱因斯坦有没有错？错在哪里？特斯拉又对在哪里？爱因斯坦的研究方向，在中国成为主导的方向了吗？

中华民族要和平崛起，中华民族要复兴，在有国家主权利益冲突时，并不是我们的敌人和朋友高兴的事。1949 年新中国的解放到如今，我国的科学技术总的说来是健康发展的，但也存在错综复杂。特斯拉的旋转磁场铁蛋实验，很能说明这个问题的量子原理。这是 1893 年在芝加哥世界博览会上，特斯拉展示的"线圈电磁铁"专利，这类能量提取非机械的振荡器，除是示范电机原理，其中旋转的铁鸡蛋也在暗示说明旋转磁场是能源萃取的装置时，这类似一个量子或一个国家，它们无一例外是镶嵌在周围的大环境中的，无论是自立还是他立，都会受到外面看不见的能量的影响或支配。

这个奇怪的设计，是用打开的一个普通的导线线圈。其实线圈电磁振荡器观念类似"大量子论"，这是用两条线奠定的一个形式。特斯拉解释说，这双线圈将存储许多倍传统线圈的能量。但看实验却很简单：这可利用三相交流电来模拟"转动磁铁所形成的旋转磁场"的作为，例如买个小功率的三相发电机模型，然后自己绕几个线圈，通上电，在线圈中间放一个金属鸡蛋，它就会旋转。即把三相异步交流电机的鼠笼式定子绕组改成平面的，通电后就会生成平面的旋转磁场。然后在中间放上金属的蛋形物体，在旋转磁场的影响下，金属蛋切割磁感线，生成感应电动势，并生成与磁场相对应的电磁转矩，所以就会转了起来。因为这个"金属蛋"类似被改造制成了电动机中的转子，这就是电动机的原理。

3、科学、科幻、杂耍与诈骗

特斯拉的旋转磁场铁蛋模型实验，提供了特斯拉批评爱因斯坦的一个重要启示基础。库马尔的《量子理论》一书开头第一章《不情愿的量子革命》中说，1881 年 22 个国家的 250 名代表聚集到巴黎，参加确定电力度量单位的第一次国际会议，但并没有对光照度的标准达成一致意见。而此时各家德国公司，却试图开发出比美国和英国等对手更高效的照明。1887 年西门子公司捐赠土地，为国家建立"帝国理工学院"，其后持续 10 多年投入最精良设备。因为在它的首要任务清单中，有一项就是要制定出国际上承认的光照度单位，制造出更好的灯泡。这项计划最后歪打正着，导致德国发现了量子。这事旋转铁蛋实验的发明家特斯拉不能不知道，众所周知，1900 年普朗克

提出量子论，爱因斯坦是继后最先提出"光量子"学说的，他们都属于旧量子论的创始人物；但到 1926 年，玻尔从反对电子自旋变成全心全意支持电子自旋，而成了一批"量子自旋博士"们中的领军人物，让旧量子理论的成就，画上了一个句号。

库马尔说，爱因斯坦一直关注新量子学的"暴风雨式的进展"。但 1935 年 5 月 4 日《纽约时报》发表了题为《爱因斯坦攻击量子论》的引人注目的文章，说爱因斯坦教授曾是量子力学的始祖，但他却认为这个理论不"完善"。原因是，1935 年 3 月爱因斯坦与波多尔斯基和罗森，完成和寄出的 EPR 论文，认为量子态信息隐形传输的超光速违反了相对论。特斯拉当时就在美国，从 1893 年芝加哥世界博览会的旋转磁场铁蛋表演到 1937 发表声明，特斯拉对量子论已经思考了 44 年，他已经老了，再不说就已经来不及了。也许特斯拉认为，玻尔的新量子论是对旧量子论的继承和发展，因为普朗克和爱因斯坦的量子论，仅停留在能量是一份份不可再分的基本单位上，这是一种量子形状静态，而对能量存在量子形态自旋运动变化的具象，有没涉及的缺陷。

应该说，这确实旧量子论的不"完善"。当然有这个缺陷并不要紧，让后来人发展就是了。即爱因斯坦有错，错就错在追随类似"质疑现有理论才能创新发展"的思潮上，打击量子论的发展前进。特斯拉对就对在他看到了量子引力论的发展前景，理由是他没去抨击 EPR 量子态信息隐形传输的疑难；也没有去攻击爱因斯坦的"假设和数学演绎方法"的研究方向。特斯拉的高大和现实意义，是他坚持用自己"观察和实验为主方法"的研究特长，如"旋转铁蛋实验"等模型，向大众作量子引力解释。

所以什么是科学？不就是"观察和实验为主方法"与"假设和数学演绎方法"的结合！特斯拉的量子引力的类似实验，如今有了超弦以及暗能量、暗物质等的假设和数学演绎方法的表达。而爱因斯坦的 EPR 效应疑难，现在有了潘建伟等科学家的量子态信息隐形传输实验、应用的作证。但 21 世纪的如今，在同一个世界、同一个国家、同一种领导的人群里，对什么是科学的认识仍然有分歧。因为人是有观点立场的，道不同不相谋，这像"旋转的铁蛋"是镶嵌在看不见的类似暗能量、暗物质的旋转磁场中的。一个量子有被镶嵌的内外环境；一个国家、一个人，也有被镶嵌的内外环境，其观点立场，也有社会看不见的类似暗能量、暗物质这种错综复杂在纠结。在民族要复兴，和在有国家主权利益的冲突时，往往会被其敌人或朋友来利用。这是一个国家、一个人难

以认识到的，只有到多年后，事情有成败，才可以看出一些眉目。

例如，日共创始人野坂参三（1892-1993），1911 年写出《论社会主义》，1920 年参加英国共产党，1922 年创建日本共产党。1931 年被日共派往共产国际，1940 年从莫斯科到延安，1946 年回日本，1955 年当选为日共中央第一书记。1956 年当选为参议员，后连续 4 次当选。1958 年日共第 7 大当选为中央委员会主席。1982 年日共第 16 大辞去中央主席职，任名誉主席。1992 年日共第 19 届 8 中全会上，被以参与陷害山本悬藏等日本共产主义者和 60 年代日苏两党关系中断后仍里通苏共为由，解除名誉职务并开除出党。听到这噩耗，野坂参三出奇地平静。次年 101 岁逝世。如果说这是政治的话，那么请看 20 世纪我国的中医和人体科学，在科学院钱学森先生和何祚庥先生涉及的两批人之间长期的争论。科学讲究求真务实，但数千年来，"科学"、"科幻"、"杂耍"与"诈骗"一直在民间和官方流传纠结，由于观点立场的不同，在这类敏感的具体问题上，就会出现分歧或分裂。对特斯拉来说，也不例外，而且深陷其中。

例如，特斯拉就被说成是"超人"，说他不但破解了传统科学，也破解了量子科学，如说他做成人工诱发地震实验；能在实验室制造出球状闪电；传说他开启反引力或虫洞实验，在美国费城做被强电磁场包围的"埃德里奇"号军舰"隐形实验"，瞬间从费城移到了 350 千米以外的诺福克，几分钟后又回到费城；他能准确预知第一次和第二次世界大战的爆发与结束日期，和铁达尼号轮船的沉没等超过 20 件的大事件，救过很多的世界富豪及政要，等等。我们认为这都不是科学的求真务实，而类似"科幻"、"杂耍"的内容；与媒体后来报导的严新、张宝胜、张宏堡、胡万林、张香玉、张小平、王林等一系列"气功大师"的负面不同，是少见特斯拉诈骗敛财的报导。

二、如何看待中医和人体科学

把特斯拉说成"超人"，不科学。实际特斯拉的人生可分为两个阶段。即以他的观察和实验为主方法衡量，真正算他奠定科学的基础性工作，是他制造的世界上第一台交流电发电机，发明的高压多相输电技术。特斯拉的成功，并不等于特斯拉就一直立足于"科学"。特斯拉后阶段的不成功，类似钱学森先生倡导的人体科学，没有把"科学"与类似"科幻"、"杂耍"的事情，像新加坡国家那样在社会层面上严格地分开。

如果说特斯拉的引力动态理论用的"生命泛旋量子"，能联系我国的中医、中药科学，那么区别也仅在于，特斯拉的观察和实验方法的运用，看重的是磁场"旋转铁蛋"。而中医、中药科学应用此方法，看重的是"中国活人"。我们说中医是科学，是它体现在追求"救死扶伤、治病救人"的实践和疗效，即使《黄帝内经》包含有"科幻"成分。

1、量子论与古中医起源的比较

量子论没有在中国出现，并不等于中国没有从磁场"旋转铁蛋"联系的生命泛旋"量子"，转移联系运用到我们"人"是生命泛旋"量子"。即这就是"中医"。我们之所以要拿旧量子论与古中医作比较，第一点是它们都是出于追求为人类谋福利的应用。

例如发现量子论的普朗克等科学家，搞出黑体辐射公式与普朗克公式，不是发了疯，中了邪门。库马尔的书《量子理论》扣人心弦地叙述了 19 世纪德国的一些主要物理学家，坚持不懈地钻研一个长期困扰他们的问题：铁制的拨火棍烧红之后，它的温度、颜色变化范围以及亮度之间是一种什么的关系？即科学说的"黑体问题"，这似乎是个小问题，不足以促使普朗克等科学家争先恐后地冲进实验室。但因这在 1871 年代，对德国来说还是一个刚刚打造成形的国家，为烧红的拨火棍问题，即后来科学说的"黑体问题"，是密切关系到德国的照明工业，即与英国和美国工业竞争的需要。

但尽管那时德国一些顶尖科学家百般努力，还是探索不出一个答案。1881 年 22 个国家参加的确定电力度量单位的第一次国际会议，没有对光照度的标准达成一致意见。1887 年在实验中，赫兹首先无意中观察到了光电效应，但对这个全新的现象，他拿不出任何解释，却错误的认为仅限于使用紫外光的情况。直到 1900 年普朗克提出量子论、黑体辐射法则，到爱因斯坦的光量子说，才得以解决。

代价是原子内部的电子的能量是"量化的"，它只能承载某些量级的能，而不能是其他的量级。原子中的一个电子，可以先处在某个位置上，然后通过释放或接收一定量的能，在另一个地方出现，而不必经过中间地带的任何地方。即歪打正着导致发现了量子；这个意义的不寻常，是"量子"不是一个现存的肉眼可视东西的物质概念，而是一个增添新假设的肉眼不可视东西的物质概念。这到现在获得了普及。这类似化学键、原子轨道等概念。这是对马列唯物主义和辩证唯物主义物质观的极大丰富与发展。

与此相似，是远古中华民族的历史就传说"神农尝百草"，这是中华民族远古政权及政权人物的一种特有现象。那时人类没有房屋，经常受到野兽的伤害；吃的是野生的瓜果、河蚌等不好消化又带

病菌的食物，有很多人得病和死亡。到神农氏那个时代，人口已经比较多，能够被推举为领袖的，自然是能帮助大家克服种种困难，战胜种种危险，寻找到大量食物，集中智慧会治病的人物。到黄帝时期，人们已经懂得用医药来治疗疾病。《黄帝内经》是我国现存医书中最早的典籍之一，虽然成书于战国至秦汉时期，但它也反映了中华民族远古政权及政权人物，对"救死扶伤、治病救人"的实践和运用疗效的追求与重视。当然这一点，在世界各国的许多民族医学中也存在。

奇怪的是，中医不同于世界各国的许多民族医学，是《黄帝内经》作为我国劳动人民长期与疾病作斗争的经验总结，不但开创了中医独特的理论体系，在《黄帝内经》这部巨著中达成了标准一致的意见，而且还超越世界各国的许多民族医学，提出了不同于现代解剖学发现的人体生理肉眼可视的消化系统、神经系统、呼吸系统、循环系统、运动系统、内分泌系统、泌尿系统和生殖系统等8大系统之外的，肉眼不可视的增添新假设的经络系统。它的完整、包容巨大和不可动摇性，是中医与量子可比较的第二点。

2、为什么中医数千年来变化不大？

特斯拉的引力动态理论推导出的生命泛旋量子，虽然发展了爱因斯坦广义相对论的引力场理论，暗含了量子引力思想，但他用的"旋转铁蛋"模型去形象地说明他的自旋量子，还只是一个球量子，缺少圈量子的线旋编码，达不到如今超弦和圈量子引力理论的高度。由于特斯拉把"旋转铁蛋"与放置环境的线圈电磁场是镶嵌在一起的，我们也说它是一个"大量子论"。由此还可以推论说，爱因斯坦的广义相对论的时空弯曲的引力场理论，也是一个"大量子论"。 1935 年爱因斯坦与波多尔斯基和罗森等提出的 EPR 效应，也想到如果要追求量子引力思想，其中有一个过不了的"坎"，那就是这"量子"不是一个现存的肉眼可视东西的物质概念，而是一个增添新假设的肉眼不可视东西的物质概念，实际是要延伸马列唯物主义和辩证唯物主义的物质观，即还有暗物质、暗能量、额外维时空等物质观。说白了，如有量子态信息隐形传输的超光速，就还有"虚数量子"的问题，它是物质正、负、虚、实、零对称不可或缺的部分。爱因斯坦迟疑了。

其实，爱因斯坦在作狭义相对论的数学公式时，也看到存在这个结论，但他把它舍去了。因为爱因斯坦认为，虚数带来的超光速，违反了他的相对论。由此看来，从 1900 年普朗克创立的量子论，到如今已经翻过了三个坎：普朗克的没有自旋的球量子论；玻尔的有虚实自旋的球量子论；彭罗斯的有虚实泛旋的扭圈量子论（扭量理论）。正是在这

三道坎门前，形成了在同一个世界、同一个国家、同一种领导的人群里，有观点立场的不同。由此联系我国的理论物理、中医学、人体科学等研究历程，其轨迹泾渭分明。

A、中医的八纲"阴阳、表里、寒热、虚实"，也可以说歪打正着赶上了这三道坎，其抽象可覆盖中西量子、以太、太极子、细胞、基因、原子、分子等概念。但中医对这些性质只是在追求治病，没有直接挑明这就是类似现代的量子论。因此经络运气作为中医具体的量子模型，中国学者却不能很好地翻译，所以西方人认为"玄"。以我国《中医基础理论》大专教材为例，经络虽然能串通中医精气学说、阴阳学说、五行学说，也只被定位为是人体运行全身气血、联络脏腑形体官窍、沟通上下内外的通道。中医理论体系的主要特点，也只总结为是整体观念、辨证论治的古典哲学运用。

B、究其原因是解放以来，虽然形成了"量子中国"发展的大好格局，但我们的"敌人"或"朋友"对我国民族要复兴，和有国家主权利益的冲突时，往往做又拉又打的手足，分化我国学者，使在三大量子坎上难有发展和突破，由此中医理论前进缓慢。

3、钱学森倡导的人体科学为什么会流产？

1981 年钱学森同志在《开展人体科学的基础研究》一文中说：人体到底有没有经络这个实体？我们先要从针刺镇痛讲起。针刺穴位和镇痛部位比较直接的联系只有神经，而通过神经传递，那就非常快。我国脑神经学专家张香桐教授发现，是针刺瞬时激发人的下丘脑，下丘脑分泌内啡肽，内啡肽再作用于神经，这个过程要 20 分钟以上的时间。我们研究人体特异功能是经过选择的对象；气功、中医理论和人体特异功能蕴育着人体科学最根本的道理，人体科学基础研究就应以整理两千多年来中医理论和气功实践为一项重要工作。当然，这种工作从新中国建立以来已经断断续续进行了多年，但似乎收效不大。我认为其中一个原因是以前的整理可以说是为整理而整理，还是用老的概念、用古代的语言去整理，缺少现代科学技术的思想。现在来开展整理可以试用把古老的语言翻译成现代的语言、现代科学的语言。但钱学森虽是专家，却缺乏量子造诣，

虽然钱学森同志建议把中医理论古老的语言翻译成现代科学的语言非常正确，但他领军能行吗？因为他的这个现代科学的语言的高度是什么呢？在 1982 年召开的人体科学筹委会第三次全体会议上，钱学森作《这孕育着新的科学革命吗？》的报告，声称："我想真正吸引着我们沿这条曲折而又艰险道路去探索的是：这可能导致一场 21 世纪的新的科学革命，也许是比 20 世纪初的量子力

学、相对论更大的科学革命。"可见钱学森的高度，只是想让中华民族独立交出一份为世界公认的，比普朗克、爱因斯坦、玻尔的没有或者有虚实自旋的球量子论还高的高度，而没有挑战彭罗斯的有虚实泛旋扭圈量子论高度新成果的意思。但钱与毛泽东同志从解放初开始就亲自领导和发动的物质无限可分说的"量子中国"世界科学大战，目标是一致的。这是一个伟大的中国梦。

（1）这个伟大的中国梦已分为两大阶段。而且历史表明，一个国家政治上的成熟与开放，这是需要时间的。有历史学家把它分为三个阶段：从建国开始，是重视军事阶段；过后，是经济阶段；最后才是学术阶段。军事阶段，实际指为巩固新生的政权，要更多强调以阶级斗争为纲；这合符毛泽东时代的特征。而经济阶段，是指开放以经济建设为中心，这也合符邓小平时代的特征。毛泽东和邓小平都是时代的伟人，顺应了国家发展的规律。毛泽东同志开创的"量子中国梦"，具体落实在"层子模型"的量子上；中国科学界的将帅们，是同心协力作过这次向诺贝尔科学奖冲刺的伟大尝试的。例如认为钱学森鼓捣人体科学是"伪科学"的何祚麻先生，就是其中的代表人物。

在毛泽东时代，层子模型属于实数的物质无限可分，是与盖尔曼假设的量子夸克模型对着干的。这是我国科技"百年战略"的第一步；成败也许并不重要，意义在于能唤醒中华无数青年向科学前沿进军，我们就是其中之一。应该说，盖尔曼的夸克模型起源于日本科学家坂田昌一的基本粒子三重态模型。但坂田昌一追随野坂参三的苏联影响，抵制哥本哈根的量子论解释，认为实数物质才有无限分割的系列和"关节"点。

（2）"层子模型"的流产，也许是策略，也许主要是我国没有大型粒子对撞机的实践。但从野坂参三----坂田昌一----夸克模型----层子模型----何祚麻的轨迹，和何祚麻先生不反对相对论的底线，可以看出当时的"量子中国梦"还保留在普朗克和爱因斯坦的量子论及相对论，这和盖尔曼发展玻尔的量子有差距。层子模型的流产冲击到邓小平时代钱学森开始的"人体科学"探索，是题中之义。但邓小平同志的高瞻远瞩，是改革开放之初人民生活还十分困难，连杨振宁先生也反对我国搞正负电子对撞机，而邓小平同志以发扬光大"量子中国梦"为重，批示建好这项大工程，为"百年战略"开好头。

也正因我国闯量子论发展的第三道坎还没有准备好，钱学森在倡导"人体科学"中，对何祚麻先生十分信任。根据是，1983 年我们向钱学森同志写信请教有关生命的理论物理时，5 月 6 日钱学森回信说何祚麻同志是此道行家，要我们请教他。

现在看来，何先生反对钱先生的"人体科学"，也许就看到钱先生的队伍没有量子论"行家"的准备。以上海顾涵森同志的《气功"外气"物质基础的研究》为例，她把实验结果的"外气"微粒流信号定为类似电磁波。但此实验布局类似我国大亚湾中微子实验，把微粒流信号一概定为电磁波量子，是缺乏有中微子类似的标准模型多种粒子认知及实验、理论对比。

（3）类似烧红的铁制的拨火棍，人能放射出"量子"吗？人可以看成是一个"大量子"吗？如果人是一个"量子"，应该怎样来观控它及应用呢？可以说最古老的《黄帝内经》奇书，是古人一开始就交出的一部绝妙"量子人学"答卷。因为它与之后的《难经》、《伤寒论》、《金匮要略》、《神农本草经》等其它医书不同，作为一部总结性的综合论述中医理论的巨著，它几乎很少涉及到汤药治疗；书中讲述人体与天文、地理、季节、气候等相关的环境，以及自身结构、生理、病理、心理、诊断、养生等存在，虽然用的是现实通俗语言，但如果把人体看成是一架"量子人"机器，该书所谓的可分为《素问》和《灵枢》的两部分，《素问》重点论述脏腑、经络、病因、病机、病证、诊法、治疗原则以及针灸等问题，是与量子机器人的"理论求实"联系的；《灵枢》内容与之大体相同，除了论述脏腑功能、病因、病机之外，还重点阐述了经络腧穴、针具、刺法及治疗原则等，则是与量子机器人涉及的使用、修理的"按钮开关"联系的。

由此可知中医学最基本、最重要的思想，均发端于此。但对《黄帝内经》的研究，历代虽不乏其人，但也正如钱学森所说，是为整理而整理，是用老的概念去整理，缺少现代科学技术的思想。要是特斯拉来读《黄帝内经》，多处类似《灵枢·卫气第五十二》中的"其浮气之不循经者，为卫气；其精气之行于经者，为营气。阴阳相随，外内相贯，如环之无端"等说法，会认为是与他的"生命泛旋量子"的观念相通的。

然而中国经过毛泽东时代和邓小平时代的洗礼，已经不再需要特斯拉这样的外国人，来帮助解读《黄帝内经》的量子人学。"中国科协 2002 年学术年会"在 2002 年 9 月 5 日至 8 日在四川成都市召开时，9 月 6 日《四川日报》发表长篇通讯《科学殿堂外的"三旋"梦》，公开了我国为实现这一中国梦跌宕起伏的探索第三坎有虚实泛旋的扭圈量子论的发现与发展过程。下面仅简介绍其"量子簸场"和"量子人"两个概念。

A、沿着最终的作用点，物质要落脚到量子水平的变化的解释，从古代希腊原子论是物质不可分的基点，到普朗克的量子论是能量不可分的基点，可知古原子论能"翻译"为旧量子论。由于已知普

朗克的量子尺度，确实到了时空可分的极点，如果把人体看成是由这种原子个体组成的，那么联系譬如山区里会簸米粮的农妇：她们能使簸箕中上下跳动和旋转着的米群，簸成有规则运动的形态，而且能扬去簸箕里的糠秕、尘土等杂物；但不会簸的人，米和糠秕是散乱及团不起来的事实————由此，如把人体及周围出现的微轻粒子场，看成象簸箕里上下跳动和旋转着的米群，假设这类簸场不仅存在于物，也存在于人，这就是一种量子意义上的簸场。

　　B、从这类量子簸场看待人，也就类似是一种"量子人"。即所谓"量子人"，是指人类进化，机体在量子层次能与其他物体易发生敏感作用的人物。量子人是相对于有形的肉体人而言的，且类似于机器人一样有许多启动开关的秘密，偶尔触动上开关或合上打开开关的序，就会发生相应的微观与宏观耦合的效应。例如中国医生高锡朋用针灸探索截瘫脊髓再生的治疗，也有产生明显疗效的。又如植物种子经射线照射后，可使新生长的植物获得高产，以及现代医学证明放射线可诱发癌肿，又可用其治疗癌肿等。

　　（4）这里固然需要能量，也有作用时间的长短、剂量的强弱之分，但更有信息密码指令意义的区别。这如极微弱的电磁波就能使电视机屏幕上出现美妙无比的图像，而吊在梁上的一块电磁铁，即使它的强度很大，作用的时间很长，也难使电视机屏幕上出现美妙的图像一样。对生命意义来说，这种信息密码指令的来源，最早也是生命的起源；是地球本身的极性，地下资源中大量辐射物和诸多元素本身的微辐射，光照、宇宙辐射等等的排列组合，数亿年来不断向地球本身提供发生变生变异的能量，从而使物质结构、电子排布发生着变化，将有部分物质重新排列组合，形成有机和无机物质的混合体或化合体，造成与晶体结构的原子间微观相互作用具有完全相同性质的一种东西。

　　在远古时期，地球上各个角落的多种类似物受到了基本相同的电磁辐射，而电磁辐射的效应是有叠加性的；设想在宇宙这颗特定的星球上，地球放射物质、地球磁场和周围星球辐射及宇宙射线的长期叠加，衍化出了更为复杂的有机化合物。这些物质的组合，最终形成了生命细胞，而其进一步的变异和组合，则要受多元电磁力和物质"配方"的决定。究其本质，这个多元的"配方"实际就是一种量子密码。

　　生物体有其共性，也有种、类乃至于个别的特性，这恰好证明了各类生命基础"配方"所受到的是同样的自然待遇，发生了同系列的衍化过程。有的配方因自然力的作用达到了系统的有序状态，而其本身又具备了在地球上生活的能力，就成为一个物种保留下来。有的配方则在不断汲纳自然的施舍，慢慢地向更高级生物种类前进。所以作为生命"配方"的电磁力和电磁波，其意义还是一种量子簸场。

　　生物钟节律，化学振荡就是一种量子簸场。而电磁力这种量子簸场在地球上促使了生命的发生，也维持了生命的存在和延续。生物体摄取营养以维持生存，实际是摄入物最终转变成符合生命基础的簸场电磁力；正是这种量子簸场力支持了生物细胞的正常活动。而任何器官因任何原因不能释放出固有的生命簸场电磁波时，都会破坏这种平衡。疾病就是身体任何部位不能或不易接收或发射自身相关簸场电磁波时的一种状态。

　　由此产生了一种统一医学观，即疾病的症结，就如正常的簸场被破坏，药物疗法是象在簸场中加上一些指示剂或凝聚剂，以调控引导簸场的运动；而自然疗法也是给簸场一种直接暗示的量子信息力，以调控恢复簸场的正常频谱运动，因此量子簸场不但是一切自然疗法的统一机理，而且也能说明一切疾病的症结。譬如电磁力作为量子簸场决定生命的兴衰，在疾病过程中，药物治疗实际上是具体的药物分子固有的电磁簸场活动所释放的电磁力，以大能量抑制了异型波或纠正了异型波而达到目的。

　　目前量子化学正是用量子力学的方法研究和解决化学中的量子簸场问题，为化学家、医药家用微观理论来认识化学世界、生命世界提供思维方法、概念和手段，比如原子轨道、分子轨道、重迭、杂化、对称性、电子云分布、能级等名词和观念已经深入到化学研究的各个环节。与此同时非线性组合、电子相关理论、组态相关理论和大量电子体系统计行为的研究，也有助于量子簸场宏观现象的解释。

　　用量子簸场对生命现象这类奇特的大分子结构、电子转移、药理机制及遗传机制进行考查，已经引起一些生物学家的关心和兴趣。当然容易入手的办法仍是以目前流行的某些不太精确的计算方法或程序为依据来开展工作；但其危险很大，因为生物分子的结构十分复杂，这样做常常会得到不太可信的诊断。从量子簸场的分析来看，例如炎症可能是机体细胞受干扰后发生了本体电磁簸场辐射的差异，它的能量小，整体本质不易受到根本干扰，因而当人们寻找到一种能纠正它的电磁簸场时，便能改正这种差异，从而获得治愈。如抗菌素分子运动中释发出或转换的电磁力低能 X 射线等物质交换手段和信息交换手段，一方面与机体自身的固有电磁簸场发生谐波共振而强壮生命体；另一方面又对细菌的功能态产生不良影响，从而获得抑菌或灭菌的治疗效果。

　　人体细胞活动所引起的电磁簸场活动，形成人

体固有的量子簸场，即在人体周围存在一个固有的振荡频谱，机体除了摄入食物、空气和水以转化为支持细胞发射这种力信息的能量外，外围量子簸场的干扰也是不可忽视的重要因素。在这两者的协同作用下，婴儿长为成人并走向衰老，这种存在和变异是严格的，任何异常均会导致生命过程的畸变。而能影响这种量子簸场变化和存在的不外乎两种手段，一种是用药物、饮食、呼吸、高压氧等具体物质携带的能量，一种是用声波或电磁波等信息交换携带的能量。

三、《黄帝内经》量子人学发轫

　　"人体科学"如果沿着创立量子论的专业科学家的这条方法道路，放眼世界排除干扰，严格试验也许会有收获。例如在阿根廷就有专业科研，结合自动化控制和大脑神经学，研制出一种能根据使用者的脑电波信号指令完成移动任务的新型轮椅。

　　因为从量子人学思考，大脑由神经元组成，当人脑产生意念活动时，相关神经元会依次放电，当这种电荷到达头皮后，可被事先贴在头部的电极及解析装置转化为脑电波。假如这种意念旨在控制轮椅移动，那么轮椅上的电脑芯片可对由这种意念产生的特定脑电波信号进行解读，得出大脑"注意力集中度"指数，进而通过程序将该指数转换成控制指令，并由红外发射器操控轮椅移动。这样使用者只需戴上一个装有脑电波检测装置的头盔，便可仅凭"想象"控制轮椅移动，其灵敏度不亚于已有的手动轮椅操控系统。而基于脑电波控制原理，这种轮椅上的传感器和电脑还能根据使用者的视线在"前进"、"后退"等显示器"字样"上的停留时间，解读其控制意念，进而完成操控。

　　科学就是科学，有了成熟的量子人学仪器的检验，特功气功假终难过关。一个量子有被镶嵌的内外环境，一个国家、一个人也有被镶嵌的内外环境。这种错综复杂纠结的观点立场分裂，使科学、社会失衡。世界类似一个大量子，人类需要和平、安宁与幸福，是这种大量子自旋自然发展的规律；也是毛泽东时代到邓小平时代的自然规律发展的必然。非专业的发展须闭口，是即使《黄帝内经》量子人学发轫的《科学殿堂外的"三旋"梦》解读，其科学也仍是观察和实验为主方法与假设和数学演绎方法的结合。

　　以"三旋理论初探"为例，对自旋的解构或建构，我们注意到一种自然全息：锅心沸水向四周的翻滚对流；地球磁场北极出南极进的磁力线转动；池塘水面旋涡向下陷落又在四周升起的这类现象，如果把它们缩影抽象在一个点上，它类似粗实线段轴心转动再将两端接合的旋转。这种原始物理的认识加上对称概念，使我们对自旋、自转、转动有了

语义学上的区分。特别是从上世纪 60 年代开始，为了调和希格斯、盖尔曼、南部一郎、彭罗斯等20 世纪到现在基本粒子量子物理模型建立呈展的四大板块，我们采用了弦论实用符号动力学的方法来整合。在不改动欧几里德几何对点的定义的情况下，补充了三条公设：（Ⅰ）圈与点并存并且相互依存；（Ⅱ）圈比点更基本；（Ⅲ）物质存在有向自己内部作运动的空间属性。这样就使得自旋、自转、转动有了语义学上的区分，例如设旋转围绕的轴线或圆心，分别称转轴或转点，现给予定义：

　　（1）自旋：在转轴或转点两边存在同时对称的动点，且轨迹是重叠的圆圈并能同时组织起旋转面的旋转。如地球的自转和地球的磁场北极出南极进的磁力线转动

　　（2）自转：在转轴或转点的两边可以有或没有同时对称的动点，但其轨迹都不是重叠的圆圈也不能同时组织起旋转面的旋转。如吊着的物体一端不动，另一端连同整体作圆锥面转动。其延伸是转轴偏离沿垂线的地陀螺或廻转仪，一端或中点不动，另一端或两端作圆圈运动的进动。

　　（3）转动：可以有或没有转轴或转点，没有同时存在对称的动点，也不能同时组织起旋转面，但动点轨迹是封闭的曲线的旋转。如地球绕太阳作公转运动。

　　根据上述自旋的定义，类似圈态的客体我们定义为类圈体，那么类圈体应存在三种自旋，现给予定义，并设定弦论实用符号动力学的区分符号：

　　面旋（A、a）指类圈体绕垂直于圈面中心的轴线作旋转。如车轮绕轴的旋转。

　　体旋（B、b）指类圈体绕圈面内的轴线作旋转。如拨浪鼓绕手柄的旋转。

　　线旋（G、g；E、e；H、h）指类圈体绕圈体内中心圈线作旋转。如地球磁场北极出南极进的磁力线转动。线旋一般不常见，如固体的表面肉眼不能看见分子、原子、电子等微轻粒子的运动，所以它能联系额外维度和紧致化及里奇张量。线旋还要分平凡线旋（G、g）和不平凡线旋（E、e；H、h）。不平凡线旋是指绕线旋轴圈至少存在一个环绕数的涡线旋转，如莫比乌斯体或莫比乌斯带。同时不平凡线旋还要分左斜（E、e）、右斜（H、h）。因此不平凡线旋和平凡线旋又统称不分明自旋。反之面旋和体旋称为分明自旋。

　　以上类圈体的三旋，邱嘉文先生已经为我们做出了三旋动画视频，可查看。

　　1、以上生命泛旋量子数学演绎方法的意义

　　特斯拉的生命泛旋量子，没有详细具体的数学演绎方法规范。但《黄帝内经》量子人学的发轫，由上可见，从"观察和实验为主方法"过渡，一开始就建立了"假设和数学演绎方法"的弦论实用符

号动力学的数学几何拓扑的定义。这种生命泛旋量子数学的探索，有两点值得注意。

第一，它解决了人与量子人的圈态对应及数学抽象。例如人体的消化系统的循环，口与肛门相通，使人是一个圈态。而有了圈态的存在，就在于数学、物理、生物、生理、化学等方面有了"转座子"的描述。而转座子是可以用原子、分子、细胞、基因、纳米、夸克、量子等粒子来对应的。其次三旋联系圈态，首先存在于微观物质。例如当代超弦理论终于承认：所有基本粒子如电子、夸克等，都是一维延展体，而不是传统物理中所假设的点状体。它们或呈环状或呈线状，始终振动着、碰撞着。振动和碰撞的不同形式则决定了该弦所对应的基本粒子。

根据现代物理学基本粒子理论,在粒子的质量与粒子的旋转矩之间存在着很深刻和有机的联系。由此从三旋的数学几何拓扑定义出发,在类圈体上用经线和纬线画出网格,即把类圈体分成环段,环段上又分格,做成一种象魔方式的魔环器,当然这种网格是可大可小的;任取一网格或一点都能在类圈体上,或随类圈体,绕过类圈体内中心圈线所构成圆面的圆心的轴旋转,或绕中心圈线旋转,我们称这种网格和点块为转座子。

转座子是结成群体效应运动的,因此它的网格图形的形状和摆布,是有规律可循的。例如从三旋的宏观数理分析来看,数学环圈的三角形网络,在面旋、线旋上不如正方形运动有序;而正方形和其它正多边形相较,它的趋圆性最小,所以不易翻动。

在从生物进化分析,如果把转座子三旋作为生物群体中基因产生遗传变异的模型,并看作是进化选择的基础,很能说明漂变。因为某一种生物的基因表达,在细胞中即使是以某一种或几种染色体,或者在染色体上是以确定的一条或几条环路的转座子排列标记的;而这种排列顺序,在某些时候,发生了某些变化,加进了某些多出的基因片断,也并不打紧。因为这种所谓的中性突变,可以看作是一种自然而然的变化。即中性漂变,是基因转座子的三旋所引起的一种正常的排列变化现象。最明显的例子是假性基因,即不起作用的基因。假性基因产生于正常基因之后,其进化的变化大体同中性说所预测的进化速度的上限一致。这同多种生物中得到不引起氨基酸变化的遗传密码三联体碱基不断变化的材料,以及在果蝇等中揭示很多的种内变异材料相一致。

第二,它解决了数学、物理、生物、生理、化学上与彭罗斯说的韦尔张量和里奇张量的联系。彭罗斯在《皇帝新脑》等书中对对韦尔张量和里奇张量作过一种统一的解释。对应三旋,面旋和体旋联系韦尔张量,线旋联系里奇张量。彭罗斯的定义是：

韦尔(Weyl)张量：不管平移或圆周运动,效果仍与直线距离平移运动作用一样,即两个物体只在定域或一维路径的作用点,存在类似的潮汐或量子涨落的引力效应。这里韦尔曲率对应保持体积不变的形变,作用类似拉长或压扁。

里奇（Ricci）张量：不管平移或圆周运动,两个物体中当一个物体有被绕着的物体作圆周运动时,该物体整体体积有同时协变向内产生加速类似的向心力的收缩或缩并、缩约作用。即在非定域或多维路径,存在体积减少的引力效应,对应里奇曲率。　　面旋、体旋和线旋之间作的这种区别对应,主要是着眼线旋的整体,各点同时具有不同方向的旋转运动,而具有里奇张量整体同时缩约协变的特征。这是面旋和体旋不具有的。韦尔张量对应不可积因子,这是韦尔研究发现微分学强调连续性,在做积分学的运算时,可微的间断在逻辑推理上始终存在,这段虚位移就叫"不可积因子"。

由此形成的"规范场"概念,被杨振宁推广成为粒子物理学的一大门类。即夸克、轻子和玻色子等标准模型粒子,可用此编码解决。但里奇说的存在物体整体同时协变的体积减少的张量效应,也许只是一种潮汐涨落引力效应和其他的物理实验可证明的效应,但引出的类似里奇流的时间熵流效应的最终出现,必然证明有一种量子信息隐形传输的点内空间超光速现象的存在。即爱因斯坦与波多尔斯基和罗森等提出的 EPR 效应的存在，是可以从里奇张量现象证明的。这是彭罗斯比其他量子信息专家的功底深。他由此搞的扭量数学,也比玻姆只把 EPR 效应的解决模糊称为"隐秩序"成功。

钱学森搞人体科学,对玻姆的"隐秩序"很看重,但对彭罗斯的里奇张量和里奇熵流与 EPR 效应联系也许不了解。这因他非专业,人体科学的隐秩序证明必流产。

2、张颖清的生物全息律为什么会流产？

如果说《黄帝内经》从生命泛旋量子提出的经络路线图和锁定的腧穴图是唯一的,那么上世纪改革开放之初,张颖清先生抓住与激光摄影的全息效应"部分与整体相似"的联系,而提出的生物全息律及衍生的不同经络腧穴,可以说是有史以来对《黄帝内经》的科学性的最大挑战,即经络路线图和锁定的腧穴图是可以人为自由变更的。张颖清对吗？他错在哪里？1983 年 9 月 16 日至 20 日首届全国生物全息律学术讨论会在内蒙古集宁市召开,我们和四川南部县的范德奎医生到会,并作了《生物全息律是开创我国未来的先声》

的报告，以示对张先生的科学探索精神和研究方向的支持。

张颖清先生当时多次当作我们的面说，这篇论文像个"图书馆"。然而与他的交谈，却发现他比较"封闭"，因此分歧阻碍了后来的交往。如果反思为什么21世纪，当我国曾极为热门的生物全息研究走入低潮时，而西方的全息学却变得越来越重要和越来越主流，此时即可以看出，中国和西方的全息学虽然都来源于全息术的启发，但一开始就是朝着三个方向在延伸：第一个是我们提出的自然全息律，它抓住的是激光摄影中需要两束相干光线。这种"两者相干"的理智解读是自然全息指一种由此及彼的自然联系与思维联系的印记。

第二个是张颖清的"部分与整体相似"的生物全息。

第三个就是西方抓住激光摄影把3维物体变为2维胶片，而可以用激光随时复现该3维图景的联系，1993年荷兰的特荷夫特提出具有"降维"意义的全息原理，即两个表面上看来非常不同的理论是完全等效的---全息等价使得一个在某一时空中难以计算的问题可以用另一种方式解决。后来得到的索斯金德等人的进一步阐述：如果要三维空间的量子引力不需要整个三维空间，那么两维空间也就足够。这引导了黑洞物理原理，和反德西特时空/共形场论的对偶性猜想，以及统一圈量子引力和超弦/M的第三次超弦革命。而《黄帝内经》正是在"降维"意义全息原理上超越了张颖清。

你想想，人体明明是只有消化系统、神经系统、呼吸系统、循环系统、运动系统、内分泌系统、泌尿系统和生殖系统等8大系统的实体结构。从4维时空来说，整体垒堆也许还多于4维。但《黄帝内经》说还有这8大系统之外的非实体结构的经络系统，这是升维还是降维？我们说《黄帝内经》多出的经络系统实际是类似"降维"描述联络、组织、调和这8大系统的"黑洞"表面二维观控图；古中医不睁起眼睛说瞎话！

（1）其实，如果说人体类似一个黑洞物理和具有反德西特时空/共形场论的对偶性，那么《黄帝内经》是早把如今全息术延伸的三个原理方向包含统一处理在内。21世纪，人类的科学不断地逼近虚时间，虚质量，虚粒子、粒子偶、零自旋等问题，由此及彼的电脑空间与大脑空间网络联系生成的赛博空间，又进一步强化了虚与实之间跨不过的坎和界。物质存在有向自己内部作运动的类似激光两束相干的自然全息"印记"，就起源于A、B两种界面的效应。它们的图像正是"实数轴"与"虚数轴"垂直；零在中点；正实数在右

边，负实数在左边；正虚数在上边，负虚数在下边。但在实际的对应中，"虚数轴"是在点内。是人们为研究的方便，理解的直观，才把它从点内空间硬"拉"出来的。三旋继自然全息把具有解答黑洞、暗能量、暗物质、德西特时空与反德西特时空等具体问题的数学方法，分为广义自然全息律和狭义自然全息律。

（2）这正是张颖清先生当时难以理解的。21世纪有21世纪的"唯物"和"辩证法"。由于三旋自然全息的引导，使对环量子、点内空间、量子计算机信息论等理解的成熟，人们已经能问何为"实"？何为"虚"？也能问什么才是"实体"？但西方全息学抓住激光摄影把3维物体变为2维胶片，而可以用激光随时复现该3维图景的联系，即便能回答额外维、影膜模型、绝对的"无"、连真空的空间也没有的"无"等问题。其图像也是"实数轴"与"虚数轴"垂直；零在中点；正实数在右边，负实数在左边；正虚数在上边，负虚数在下边；在实际的对应中，"虚数轴"是在点内。但从环量子观点看，西方仍多用球量子；从点内空间观点看，西方仍多用点外空间；从量子计算机信息论观点看，西方仍多用电脑信息论。这些是"科学"还是"科幻"？

（3）同样的问题，《黄帝内经》"降维"意义的全息经络路线及腧穴图和运气学说，是"科学"还是"科幻"？这是回答为什么《黄帝内经》能超越时代的关键。

我们说古中医经络路线及腧穴图，不同于张颖清的生物全息经络路线及腧穴图，是在《黄帝内经》中具有很多严格针刺治疗的警戒规定，而且十分完整、详细、系统，这是"科学"。当然无可讳言，由于时代等局限，《黄帝内经》也有"科幻"成分的地方。也许科学研究从《黄帝内经》成书年代起，"科学"和"科幻"就结伴而行。但"科幻"不是科研，也不是科学；它只是一种思维。那么什么是科学和科幻？

科幻即是科学幻想，正统科幻迷主张科学与幻想缺一不可。倘若没有任何科学根据，则只能归为奇幻、魔幻或超现实作品。即科幻只是为人们提供了幻想的平台，文学文化交流的平台。它和科学的实践性、技术性、验证性相比，科学就不光要看它的公理是否来源于直觉、实验或有充分理由，而且会严密地审查推导过程中的任何细节，并考查其任一导出结论是否与实验或生活经验相冲突。而这一系列工作都不是非专业的"大科学家"和"大学问家"纠结群流能做的。我们说中医、中药是科学，《黄帝内经》是科学，是古中医从理论到治疗，坚持用历久弥新的疗效实践，来检验它的"科学性"的；是以救死扶伤、

治病救人的实践、疗效在体现。所以针刺治疗，后来也并不占中医的主流；在结束原始生活的后期，是用汤药治疗的疗效实践，来丰富它的"科学性"而占据主流的。这也说明中医的"开放性"，是它的科学性特征之一；但非专业并非开放。今天中西医结合开放《黄帝内经》量子人学专业，都大放光彩。

以此类推，我们说也要说，中国的魔术杂耍、幻术表演，气功特功、带功报告及表演等，不是科研，也不是科学。气功源流古称吐纳、打坐、坐禅等，没有一个统一的名称，类似印度的瑜伽，数千年来在民间流传只是一种民俗。据张洪林先生介绍，上世纪 40 年代末，河北省刘贵珍因传播养生锻炼方法，受到河北省卫生厅的重视，他们这些养生锻炼方法才统一命名为"气功"。1955年卫生部对刘贵珍予以褒奖，刘成为气功领域的权威人物，"气功"之说和学练气功才在全国开始传播。

二十世纪七十年代末、八十年代初，以"耳朵认字"为起点，演化为时不时地掀起的气功"人体特异功能"的群众热潮。事情的复杂性还在于，非专业的"大科学家"和"大学问家"的介入，把这种风行中曾出现过混淆科学视听，有作假、骗财等手段，和当搞宗教组织的工具等问题，不用法制处理而当作意识形态。由此当时先后担任中共中央宣传部长、组织部长、中共中央主席、中共中央总书记的胡耀邦同志有指示："这类事情，科学工作者要怎么办可以由他们去办。但不能公开宣传。宣传这类事情对四化没有一点用处、好处。中国还是一个落后的国家，宣传这类事只能增加人们的迷信和思想混乱。这一点务必请你们把关"；"这不是我们的科研方向和在科学上还没有充分证实之前，报刊上不宣传，不介绍，也不批评，这两者我看是稳妥的，公正的，要坚决这么办。但可以允许极少数人继续研究这个问题，也允许他们办一个小型的定期的研究情况汇编，发给对这方面有兴趣的科学工作者阅读和继续探讨。"

作为国家政权和政权人物，胡耀邦同志的这种分清科学与法制的处理方法是可行的。后来国家对此进行清理整顿，也是必要的。如果说面对《新京报》记者问"你相信有特异功能吗？"著名"中国魔王"傅腾龙先生说："我见过的特异功能都是魔术"；《新京报》："那气功呢？"傅腾龙："也没见过"，这是科学答案，那么曾任钱学森的秘书的涂元季先生在《人民科学家钱学森》一书中说：钱学森是中国人体科学的倡导者，"他认为气功、特异功能是一种功能态，这样就把气功、特异功能、中医系统理论的研究置

于先进的科学框架之内，对气功、特异功能的研究起了重大作用"，钱学森就没有道理吗？钱学森内心的科学是允许以假当真、诈骗、敛钱吗？

科学讲究求真务实，科学和科幻与魔术杂耍表演和特功气功表演比较，科幻中有建筑在科学的构想基础之上的东西，也有最终实现的，但最终是属于一种思维。魔术杂耍表演众所周知，是依靠一些特殊的道具和手法来实现目的；但作假敛财的特功气功报告、表演，却偏要把假说真，这也相反。科幻也有类似特功气功中的负面，如有把科幻当成科研成果的，或者把写科幻当成科研的。田松先生跟踪研究这些负面现象时指出：社会上有相当一部分人，既没有受过系统的科学教育，不掌握科学研究的方式方法，又与科学共同体没有正常的联系，但却认定自己作出了某某重大发明创造，将自己的精力投入到虚无飘渺的"科研"上去，在社会舆论中，也恰恰授人以柄。

3、科学与政权及政权人物

我们说《黄帝内经》存在有科幻的成分，不是说它有负面，而是想从它的正能量揭示《黄帝内经》中，量子科学思维的超前来源。《黄帝内经》集中提到的黄帝、岐伯、伯高、少俞、雷公等政权人物，研究者多认为是假托。但这也揭示，由于《黄帝内经》是成书于两千多年前的远古时代，这也说明当时的所有作者，已明白科学与政权及政权人物之间的紧密关系。毛泽东时代，毛泽东同志并不是量子粒子物理学家，但也十分关注古今科学的物质无可分讨论。邓小平时代，邓小平同志更是直接提倡"科学是第一生产力"。古今相通。即国家政权及政权人物很早就认识到，科学是一项造福人类的社会事业。由此说明科学也是一种态度、观点、方法。

（1）潘建伟现象

库马尔说，1871 年刚刚打造成形国家的德国，为了赶超英国和美国，夺得照明工业竞争和前沿量子科学发现的优先权，从 1887 年开始全国上下持续 10 多年投入最精良设备，打造建立德国"帝国理工学院"，最终导致发现了量子。

类似的情况和有这种气概的是，经过全球近 20 年来的研究发展，量子信息已被认为可能是下一代通信和计算机的支撑性技术，并在目前进入了早期产业化阶段。如何抢占这一具有重大战略意义和经济价值的新兴产业制高点，成为当前国际科技竞争中的一大热点。对此，早怀着"量子中国梦"的毛泽东时代，我国 1958 年也在打造建立"中国科技大学"，而最终也导致潘建伟教授等在量子态信息隐形传输方面占领了一席世界高地。英国著名的科学新闻杂志《新科学家》等对潘建伟科大团队的评价是："中国科大——因而也

是整个中国---已经牢牢地在量子计算的世界地图上占据了一席之地。"；中科大量子调控研究团队创造了系列"世界首次"。

2013年7月17日中共中央总书记、国家主席、中央军委主席习近平同志到中国科学院考察工作时，同中国科学院负责同志和中科院院士潘建伟等科技人员代表座谈，潘建伟院士就量子信息领域科研作了发言。在听取大家意见和建议后，习近平发表讲话指出："科学技术是世界性的、时代性的，发展科学技术必须具有全球视野、把握时代脉搏"。　探索虚数超光速的存在，是科学与政权及政权人物中最敏感、最深沉的问题之一。但习近平讲话指示："当今世界，一些重要的科学问题和关键核心技术已经呈现出革命性突破的先兆。我们必须树立雄心、奋起直追，推动我国科技事业加快发展"。这是新一代的政权及政权人物对科学作出的最英明指导和寄予的厚望。

中国政权及政权人物对"量子梦"的重视程度，潘建伟是一杆标杆。2001年，潘建伟作为"中科院引进国外杰出人才"，同时获得了中科院基础局和人教局的支持，开始在科大组建实验室。研究工作几乎从零开始，实验室组建之初，潘建伟当时向科学院申请的经费是200万元，而院基础局拨了400万元。2004年，实验室进入国家实验室，成为量子物理与量子信息研究部，得到了快速的发展。而早在潘建伟还只是个博士生的时候，时任中国科学院副院长的白春礼（现任中科院院长）就关注到潘建伟，且白院长对潘建伟一直保持着师长般的理解和宽容。由此，潘建伟的"量子梦"，从中国逐步跻身国际一流的量子物理研究，再到积极实现产业化的量子信息应用。

潘建伟和郭光灿同是科大量子信息领军人物，但对"科学问题呈现出革命性突破的先兆"态度各有些不同。潘建伟从不暴露和科普对"非定域性虚数超光速问题"的态度，沉住气只埋头做实际工作和在专业杂志发表研究成果。说明他掌握分寸。

郭光灿院士2009年和高山合著出版有《爱因斯坦的幽灵》一书，他在"跋"中说："爱因斯坦沉浸在引力几何化的优美思想中无法自拔"。蒋春暄先生评价该书说，郭光灿的这本书是讲"量子通信、量子计算机等广泛应用，是和超距、超光速联在一起的；爱因斯坦宣布超光速不存在，到今天仍不承认超光速"。郭光灿说爱因斯坦迷失方向，实际他和蒋春暄一样主张用"实数超光速"来守住"意识形态阵地"。

复杂在于爱因斯坦1905年开始科学起跑时，就支持波尔兹曼，支持列宁；而且就像今天额外维弦论剔除鬼神一类反唯物论的超自然现象一样，果断地把他狭义相对论方程存在的虚数解剔除出去。再单从他与玻尔的争论和1935年出的量子幽灵EPR难题上看，实际也仅是用虚数或实数超光速两难，威胁玻尔：即如果玻尔赞成有虚数超光速，就是反对当时的唯物论；如果玻尔赞成有实数超光速，就是反对了他的相对论。

也许如果爱因斯坦能像郭光灿的实数超光速量子隐形传输原理图；奥地利物理学家安东·塞林格（Anton Zeilinger）小组的虚数超光速量子隐形传输实验原理图；彭罗斯的研究霍金辐射----由粒子及其反粒子构成的成对粒子，彼此湮灭并最终双双消失前的短暂时间，在真空区自然出现的类似双曲线的，最为接近阴阳、正反、虚实相对划分的描述量子纠缠非因果性传播的量子隐形传输图，那么量子通信与量子信息技术的发展，也不会等到20世纪90年代初才出现。这里为什么要拿彭罗斯作比较？

因为彭罗斯的巨著《通往实在之路》一书，实际是用虚数超光速直接解释的纠缠性量子幽灵的。因为彭罗斯把发送者的测量发散U操作点，和使得位于接收者的R态收缩同时点的这两点的连线，是用过去时联系的非因果量子纠缠态点画线标注的，这实际就是一种虚数超光速解释。这条过去时联系的非因果量子纠缠态连线，我们说实际就在"点内空间"，它变成了点内空间类似毛毯一样折叠的连续的多层膜路的一种额外维。这里的点内空间，也类似人们常说的"赛博空间"。

量子信息隐形传输，纠缠不等于共轭，共轭不等于缠结，缠结不等于幽灵，幽灵不等于超光速，超光速不等于实数超光速，实数超光速不等于虚数超光速。爱因斯坦反对有实数和虚数超光速，但实际又领军和坚持有实数超光速观点的，结成反相反量大军的主流。真是人间奇事。那么潘建伟的态度呢？有人说潘建伟的工作或多或少与奥地利物理学家塞林格有关联，因为潘建伟是塞林格的优秀研究生之一。

量子纠缠最重要的两个应用是量子通讯和量子计算。量子纠缠基础理论的EPR佯谬，后来是用实验验证贝尔不等式来检验，称为量子力学非定域性的课题，其目的就是要验证量子力学到底是定域的？还是非定域的？因为有关"定域"、"隐秩序、隐变量"等争论尘埃未定，量子纠缠研究及应用方面至今未出诺贝尔奖得主；贝尔于1990年虽然被提名为诺贝尔奖，遗憾的是那年他因脑出血而意外死亡。

先后用一系列越来越精妙的实验，验证了贝尔不等式的阿斯派克特、克劳瑟和塞林格等三位实验物理学家，2010年已被授予了沃尔夫物理奖，因为他们扩展了量子纠缠态在通讯及计算机应用

方面的研究，对其量子力学理论和实验方面的贡献已经得到了学术界的公认。这中间特别是塞林格，已经建立起的一个量子连接，适用于量子态隐形传输。塞林格等领军人物，深信这种非定域性超距作用的真实性是量子力学（或微观世界）的根本特征，这实际是肯定量子纠缠隐形传输属于虚数超光速的。

塞林格已经影响到相当多的学者和学生。所以北大物理学院王国文教授说："中科大郭光灿和潘建伟两位对量子纠缠的理解，郭光灿和潘建伟两个团队在涉及量子纠缠的几乎所有论文，所依据的原理、采取的实验路线和实验结论都是错误的，至少值得商榷。这与欧洲的塞林格和吉辛等领军人物对量子纠缠的错误认识有一定关系。美国政府在新一轮科研计划中不再支持这类研究，可能已经在怀疑那是一个大骗局"。

（2）王令隽现象

非定域性作为未来开发的资源，国际争夺激烈。但有人举混沌、分形、几何相位、高温超导理论、复杂性理论、宇宙学理论、弦论等例子，说它比上述领域呈现的病态特征而尚未显示出一点起码成果更糟。美国已介入我国，由此它是否会风云一时最后以昙花一现方式离场的怀疑声浪不断。梅晓春先生说：揭穿中国量子隐形传输骗局，对潘建伟院士等要用"量子隐形态传输"做全球通讯网络，美国田纳西州大学物理系教授王令隽先生曾无不讽刺地说："河神要取媳妇，就先请河神现身让人看看！"

现在就请王令隽现身，先让人看看王令隽现象的淋漓尽致的表现。

这里从他的《前沿科学还是前沿神学》一文中，摘录几个片段，可供世人品味：

A、格拉肖和里奇特没有说超弦理论或超对称理论是伪科学，而说是神学（注：格拉肖口头反对弦论，实际在暗中培养他的学生领军弦论，是个"科学阳谋家"）。

B、霍金的这种伪装的可能改变历史以统治世界的"前沿科学"，至今并没有被纳入任何国家的绝密军事研究课题，倒是花费了不少政府的物理科研经费，也通过卖科普小册子和拍电影赚到了不少老百姓税收以外的钱。

C、中国国情如何？搞超弦理论的人们在被"打击专政"？恰恰相反。中国多次邀请霍金访问，得到了国宾级甚至元首级的礼遇。可见中国科学院和中国政府不仅没有对霍金的理论进行"专政打击"，反而尽量保护甚至帮助开拓发展空间。

D、彭罗斯把爱因斯坦方程"粗略"地理解为"里奇=能量"，并产生"缩并力"的奇想，只能

说明他不但没有学懂爱因斯坦为什么要将黎曼张量收缩为里奇张量，而且连中学物理的"力"的概念都没有学懂。

E、像超弦和超对称理论这样的所谓"前沿科学"、"基础科学"不仅和现代科学的所有成就（空间科学，核科学，电脑，网络，遥感，激光，超导等等等等）毫无关系，就是和理论物理的娘家---核物理---也扯不上任何关系。

F、赶超西方的雄心是好的，但应是科学赶超，而不是神学赶超。科学不是荒唐比赛。在数学创造论方面落后于人，没有什么丢脸的。

H、中国搞超弦理论的人不多，不是坏事，更不是中国落后的标志。

把前沿科学说成是神学，是美国的一个"阳谋"。中国多次邀请霍金访问，就是支持"神学"吗？潘建伟做中国量子信息安全的应用，就是在搞"神学"吗？王令隽又拉又打是在帮助中国还是美国？请看量子科学前沿的世界最新动态。

（1）　量子在前进

跌宕起伏的量子的发现和理论的创立与发展，让量子物理学被看作是 20 世纪科学的最伟大冒险之一。其实，量子物理学正好是解释了中医及《黄帝内经》中的"玄"论。但这种超弦超对称的量子化之路能站住足吗？

A、依据哥本哈根解释，从普朗克、爱因斯坦到玻尔进一步的"量子假设"，自然规律既非客观实在的，也非确定的，而仅仅是一种可能性的统计分布。玻尔认为，原子内部的电子的能量是"量化的"，它只能承载某些量级的能，而不能是其他的量级；原子中的一个电子，可以先处在某个位置上，然后通过释放或接收一定量的能，在另一个地方出现，而不必经过中间地带的任何地方。

这里玻尔实际是讲，这里就有量子态的隐形传输。这些旧的量子论历久弥新，据 2013 年 7 月号《环球科学》杂志发表美国威廉学院荣誉教授、理论粒子物理学家冯贝耶尔等的文章《量子悖论只是想象？》说，量子力学是一种非常成功的理论，可是它充满了奇怪的悖论。新版本的量子理论将微观世界里的种种奇怪悖论一扫而空。这是一种名为量子贝叶斯模型（量贝模型）的新观点，融合量子理论和概率论，重新构建量子悖论中的核心概念"波函数"。量贝模型认为，波函数并非真实存在；波函数只是一种数学工具，是对观察者心理状态的描述，是个人主观心理状态的反应。

B、2013 年 8 月 2 日邓如山先生编译华沙大学物理系网等的资料说，在第 20 届关于广义相对论和引力（GR20）国际会议及第 10 届关于引力波的

爱德华多·阿玛尔迪（Amald10）国际会议上，波兰华沙大学物理系的教授莱万多斯基提出新版本的"圈量子引力"（LQG）理论。这是波兰科学和高等教育部以及国家科学中心的资金支持的结果。波兰在 LQG 物理学领域进行的这项有显著成果的探索思路是：空间-时间的结构在某种程度上相似于一个纤维组织，圈量子引力的时空由大密集数量的、微小的、缠绕成圈状的纤维组织构成，而能将量子力学和广义相对论联系起来。在这个数学模型的时空结构中，一个拥有每 1 平方厘米的"时空场，由 10 的 66 次方的纤维构成。

这两种最简单的量子引力效应与物质相互作用的情形是：在量子力学和广义相对论两个相互作用的领域中，一个是重力弯曲了时空，而弯曲的时空导致了引力的效应；另一个是标量的纯量的领域，可以理解为最简单类型的物质，物质的数量分配给每一个空间上的"交叉点"。每一种类型的物质在与空间-时间的相互作用中，都会表现出相同的特性：零静止质量的粒子和非零静止质量的粒子。

零质量的粒子的情形，比如说是光子。非零质量的粒子，比如说是希格斯粒子。希格斯粒子的质量是一个纯量标量，赋予其它的粒子以质量，诸如夸克、电子、介子、陶子和与它们有相互联系的中微子。莱万多斯基根据量子引力的模型，导出了表达粒子行为的方程式，并开始检验对于具有不同对称性的规范的空间-时间在和不同类型粒子相互作用的过程中，能否获得相似的和不相似的方程式。结果是，对于零质量的粒子而言，方程式能够证明这些粒子对应的时空在所有的方向上具有同样的性质。无论"零质量"的光子有更多的能量，还是更少的能量，有更大的动力，还是更小的动力，光子所对应的时空在所有的方向上是一致的。

对于非零质量的粒子情形就不同，粒子质量的存在似乎是一种理论模型中的附加条件，一个典型的时空结构，既能满足粒子质量的条件，又能满足时空在所有方向具有相同特性的条件，是不可能建立起来的，或者说只能够建立各向异性的时空结构，在这种异性的时空结构中，空间-时间的优先

方向就是粒子运动的方向。即非零质量的粒子在运动的过程中，经历着不同性质的空间-时间体系。不仅如此，每一种带质量的粒子都会具有"自身版本"的空间-时间概念，它的运动方向决定了它所经历的时空特征。

从安培、法拉第、麦克斯韦的电磁场微小旋圈耦合交变，再到特斯拉的生命泛旋量子、旋转线圈，一直发展到今天波兰物理学家们的新版本的"圈量子引力"，历久弥新，不可能是用"神学"抹杀得了的。我们指出各阶段的科学前沿研究都指向量子世界，包括中医及《黄帝内经》中的"玄"论。对于量子世界而言，我们处在一个"外在的世界"，用量子论的眼光看待从时空到人体的结构，没有一个偏好西医或中医的方向，都具有各向同性的特征。但面对类似王令隽现象的科学与政权及政权人物纠缠的现实，已历尽沧桑的中医量子人学探索，也许仍将路漫漫兮。

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Effect of host plants on the life-history traits of *Trichogramma chilonis* (Ishii) at different constant temperature

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Abstract: The pod borer, *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae), is considered to be the most important pest of several crops. In northeastern Uttar Pradesh, it is a major problem on chick pea (*Cicer arietinum*), Pigeon pea (*Cajanus cajan*), and Tomato. *Trichogramma chilonis* Ishii (Hymenoptera: Trichogrammatidae) and *Campoletis chlorideae* Uchida (Hymenoptera: Ichneumonidae) are tiny wasp, and considered as egg and larval parasitoid respectively, of several lepidopteran host including *H. armigera,* and are widely used in biological control. The aim of the present study was to control the pest population of *H. armigera* by using these parasitoids. Five districts of northeastern Uttar Pradesh, namely Gorakhpur, Kushinagar, Deoria, Mahrajganj and Sidharthnagar, was surveyed for the incidence of *H. armigera* on different crops such as chick pea, Pigeon pea and corn. The results revealed that pod borer was a major pest of chick pea and pigeon pea in northeastern Uttar Pradesh. Two parasitic wasp, *T. chilonis* and *C. chlorideae* were naturally occurring, also noted the high rate of parasitism in the field on crops under study .These findings can be used in the control of *H. armigera* on crops where natural parasitism seemed to be high.

Key Words: *Helicoverpa armigera, Trichogramma chilonis,* Progeny sex ratio, Biological control.

Introduction

The American bollworm, *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) is a pest of major importance in most areas wherever it occurs, damaging a wide variety of horticultural agricultural and crops .This pest is regarded as number one among the ten worst pests all over the world and causes economic losses (Pandey *et al.,* 2000). In Uttar Pradesh, India, it is one among major biotic constraints for the cultivation of pulse crops (Pandey *et al.,* 2004; Pandey and Tripathi, 2008; Pandey *et al.,* 2009). The ecological and physiological features like direct attack on fruiting structures, voracious feeding, high fecundity, multi-voltinism, occurrence of overlapping generations and ability to diapause during unfavorable conditions has made this pest a 'bugbear', particularly in Eastern regions of this state. On average a 30% crop loss is reported. This can be witnessed from progressive decline in area and production of chickpea during the past three decades. While area has gone down from 17.26 lakh ha in 1975-76 to 7.40 lakh ha in 2005-06, the production has decreased from 12.50 lakh tonnes to 6.61 lakh tonnes (DACNET).

Chemical pesticide application is the most commonly used method against *Helicoverpa* in this region, but it cannot wipe *Helicoverpa* out since, it easily develops resistance to applied chemicals including pyrethroids (Patel and Koshiya, 1999). The

potential of applied chemicals is also screened off as the grown up *Helicoverpa* larvae mostly feed upon developing grains inside the pods. In addition, large quantities of persistent insecticides are raising concerns about applicator safety, environmental contamination and possible deleterious effects on non-target animals and humans.

As an alternative, biological control is generally perceived as providing both long-lasting insect control and having less potential for damage to the environment and non-target organisms than chemical interventions. The use of bacterial (e.g., *Bacillus thuringiensis*) and viral insecticides (e.g., NPV) for the control of *H. armigera* is the most recent achievement in biological plants protection (Grzywacz, 2001). However, at present the application of microbial pesticide in India is negligible and worldwide still present around 1% of crop protection. Undoubtedly, they are potential biocontrol tools for managing *Helicoverpa* population on chickpea; resistance to biorationales is likely to evolve rapidly unless they are used as part of coherent resistance management strategy.

The use of genetically modified (GM) crops that express insecticidal genes, such as those derived from the soil bacterium *Bacillus thuringiensis* (Bt), have opened new endeavors to control insect pests of agricultural crops. As with cotton, the expression of *B. thuringiensis* cry genes is an option to protect

chickpeas from damage by *H. armigera* (Romeis *et al.,* 2004). However, transgenic chickpea varieties that express either Cry$_1$Ac or Cry$_2$Aa, or both proteins, are currently under development and could become commercially available in the future (Sanyal *et al.,* 2005; McPhee *et al.,* 2007). It is therefore, an urgent need to devise alternative control measures, which can be applied to control this dreaded pest on chickpea in an economically and ecologically agreeable manner.

Biological control of insect pests utilizing parasitoids has been advocated as one of the most recent techniques and unlike other control measures its effect is permanent, ecologically non-disruptive, self-sustaining and after the initial costs involving investigations and release, the recurrent costs are nominal.

For successful biological control program of insect pests, the parasitoids should be synchronized with its host (Weeden and Hoffman, 2001). For example, if it is an endolarval parasitoid, sufficient number of hosts must be present in the management area at the time of its best reproductive fitness. Any delay in the availability of hosts may strongly affect their reproduction and survival. Host shortage is likely to occur in nature, reducing the efficiency of parasitoid species. None of the parasitoids can manage the fecundity and progeny sex ratio, if it is deprived of host for a long time. However, a parasitoid which can tolerate longer host deprivation times would be considered good. These aspects are highly important for the implementation of an efficient mass rearing program as well as in the inundative release of the parasitoid species.

The ichneumonid *Campoletis chlorideae* Uchida is a common parasitoid of the pod borer, *Helicoverpa armigera* (Hübner) on chickpea crop in India (Thakur *et al.,* 1995; Durairaj, 1999). It is an arrhenotokous, idiobiont parasitoid species, which effectively parasitises the second instar larvae of *H. armigera*, both at vegetative and fruiting stages of the chickpea crop. Previous studies revealed that *C. chlorideae* may be considered as a promising alternative to the exploitative and disruptive chemical control measures against *H. armigera* on chickpea in Eastern Uttar Pradesh, India (Pandey *et al.,* 2004; Pandey and Tripathi, 2008; Pandey *et al.,* 2009). However, before any attempt is made to mass rear and release this parasitoid, the factors that may affect their reproduction and survival must be understood. In this regard one important factor to be considered is host deprivation.

Materials and Methods

The age specific life table statistics of parasitoid *T.chilonis* was determined at five

parasitoid densities (1, 2, 4, 8 parasitoid/days). The newly emerged mated and well fed female parasitoids of the same cohart were introduced into marked wooden cage (30×30×45 cm) having young potted pigeon pea,chick pea and tomato with almost 200 *H.armigera* eggs. The female were introduced singly into the cages for 24 h.

A small sponge piece soaked in 30%, honey solution was available as food for parasitoid. After every 24 h, the exposed eggs along with the host plant were replaced by flesh ones throughout the life of female parasitoid. The cages were illuminated by two 40 w flourosent lamps for 14 hour. The cages were sprayed with water from an atomiser at least once a day to maintain the proper female parasitoid (150 for all the four parasitoid density x three host plant) was used. The parasitized eggs when turned black that picked off together with part of leaf and were put into marked tube (1×5 cm) each having a moist filter paper at their bottoms. The emerged parasitoids were sexed and counted.

Culture of the host

The field collected larvae were transferred singly with help of a small camel hair brush into glass vials (10 x 3.35 cm) having moistened filter paper at their bottoms. The mouth of glass vials was plugged with absorbent cotton. Fresh and green leaves and pods of chickpea were provided as food for the host larvae and were reared until pupation. After pupation, the pupae were transferred to the fresh sterilized glass vials having moistened filter paper at their bottoms. Emerging adults were provided a 30% honey solution as food.

For the culture of *H. armigera,* a couple of adults were kept together in a beaker (1000 ml) until mating was observed. Moistened filter paper was kept at the bottom of the beaker to provide humidity inside it. A strip of muslin cloth was hung inside to provide rest to the flying moth when needed. The mouth of the beaker was covered by a muslin cloth. The mated females were then removed from the beaker and introduced into the small marked wooden cages (45x50x60 cm) containing potted young plants of chickpea. A piece of sponge soaked in 30% honey solution was kept in each cage as food and was changed daily. The eggs deposited each day on the leaves and pods of host plant, were transferred to the marked beakers (250 ml) and kept until hatching. The larvae were then collected in glass tubes (10x 3.25 cm). For the culture of hosts of a known age, only newly hatched first instar larvae were allowed to remain in the beaker and the rest were removed. Second instar larvae, which are most preferred by the parasitoid were collected from the maintained culture and were utilized as hosts for the experiments.

Culture of the parasitoid

The field collected cocoons of the parasitoid were transferred singly with a small camel hair brush into glass vials (10x 3.35 cm), each having moistened filter paper at their bottoms. Adults emerging from the cocoons were then fed 30% honey solution *ad libitum* for 2-4 hrs. Thereafter, the female and male parasitoids were put together in a glass tube (10 x 3.25 cm) until mating was observed (2-6 hours). The males then were removed from glass tubes. The mated females were introduced into the small marked wooden cages (45 x 50 x 60 cm) having potted young plants of chickpea and about 100 healthy second instar host larvae. A small piece of sponge soaked in 30% honey solution, was placed into the each wooden cage as food for the parasitoids. After parasitisation, the parasitoids were removed and the host plants were placed into cages (30 x 30 x 40 cm) for further development. The potted plants were examined daily for cocoon formation. The cocoons were then collected and transferred singly into the marked sterilized glass vials. After adult emergence, the number of each sex was determined.

To observe the effects of host deprivation times on the reproduction and survival, a couple of adults virgin male (M) and female (F) *C. chlorideae* were obtained from culture and kept together into separate tubes (Ca. 1x10 cm) until the mating was observed. Now, mated females, deprived of hosts for 0, 1, 3 and 5 days were introduced into four separate wooden cages (Ca. 45 x 50 x 60 cm), each having potted young plants of chickpea and about 100 healthy second instar host larvae for parasitisation. After every 24 h the females were removed from their respective cages and after proper feeding and rest, re-introduced in other similar cages having potted young plants of chickpea and about 100 healthy second instar host larvae throughout their life. The exposed host larvae were placed in other cages and examined daily. As soon as the parasitised larvae transformed into cocoons, they were counted and transferred separately with a part of the leaf to glass vials (1 x 5 cm) having moist filter paper at bottom. Upon adult emergence, the number of each sex was determined (Pandey *et al.,* 2009).

Calculation of Life Table Statistics

Under constant environment conditions the growth rate of a population can be used to demonstrate the relative measure of exponential growth and to conceptualise the relationship between demographic variables and population growth, which is more or less constant and than the population assumes a stable age composition (Birch, 1948; Pressat, 1985). For such a situation,the growth rate of the population can be calculated directly from the

vital statistics of the age specific survival and net fecundity rates under naturals condition which is fault as "intrinsic rate of increase (rm)".the value of rm under optimum condition indicates the maximum biological potential of the population and growh in that situation.

Results
Progeny sex ratio

The data related with the influence of parasitoid density on the number of progeny yield as well as on the progeny sex ratio.

The progeny sex ratio was calculated as proportion of males in the progeny population. They showed significant effect of both the parasitoid density and host plants food (chickpea, pigeonpea, tomato) on the progeny sex ratio of the parasitoid *T. chilonis*. The regression analysis of the progeny sex ratio on the parasitoid density yielded significant relationship coefficients are significant (PSR $_{(Pigen\ pea)}$ =0.444+0.014 X, r = 0.989, P < 0.001; PSR $_{(Chick\ pea)}$ = 0.474+0.020 X, r = 0.981, P < 0.001; PSR $_{(Tomato)}$ = 0.538+0.21 X, r = 0.972, P < 0.001) (Fig-1). We observe that alimited supply of the hosts with increasing number of parasitoids always increases the production of male progeny in the population irrespective of host plant used. It shows that to increase the proportion of female progeny in the population, sufficient number of hosts should be made available for the parasitoid.

The data of progeny sex ratio obtain from the eggs laid during subsequent days after emergence revealed are progressive increase in the sons population in progeny, irrespective of host density variation. It implies that the probability of deposition of daughter producing eggs (diploid eggs) decreased on the successive days of oviposition.
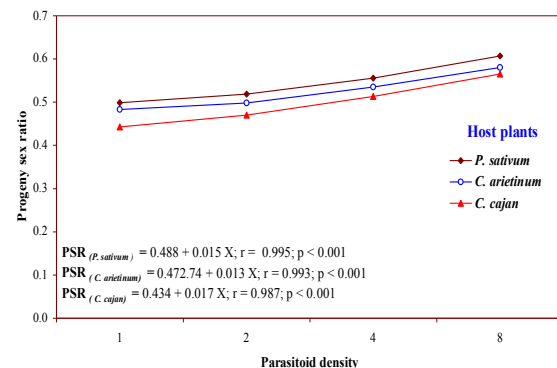

Figure 1. Effect of host plants on progeny sex ratio traits of *Trichogramma chilonis* (Ishii) at different constant temperature

Discussion

Figure shows that sex ratio decreased with increase of parasitoid density, however, it is still significantly more than the Fisherian ratio ($P <$ 0.001) (Fisher, 1930). The Fisher's model predicts that, in panmictic population, investment in the production of male and female should be equal, however selection for sex ratio other than 0.5 may arise if the assumptions underlying Fisher's model do not apply.

In arrhenotokous wasps like *T. chilonis* (where males develop from unfertilised eggs and females from fertilised eggs), regulation of the release of sperms from the spermatheca may, therefore, control sex ratio (Flanders, 1939). The sperm release from the spermatheca is influenced by several extrinsic and intrinsic factors (Sinha and Singh, 1979; Islam and Copland, 1997). The decrease of sex ratio with increase of parasitoid density may be explained on the following accounts: (1) increase of parasitoid density increase the rate of superparasitism (van Alphen and Nell, 1982; Hofsvang and Hågvar, 1983; Dhiman and Kumar, 1987) in that situation the second female lays more male eggs (Wylie, 1976; Werren, 1980); (2) parasitised hosts provide less sources for larval development than healthy hosts (Waage and Lane, 1984; Tripathi and Singh, 1991b; Pandey and Singh, 1997; Honek *et al.,* 1998) and males because of their lower nutritional requirements (Charnov, 1982) fare relatively better (Narayanan and Subba Rao, 1955; Wilkes, 1963; Waage and Ng, 984; Hardy, 1992) and (3) parasitising females, and change their sequence of sex allocation (Waage, 1986). Stimulus for this change may have been contact with traces of their female, by physical jostling of female by other individuals (Sinha and Singh, 1980a) or encounter of parasitised hosts (Singh and Sinha, 1981; Islam and Copland 1997;). Frequent contacts with conspecific females lead to male-biased sex ratio (Singh *et al.,* 2001c; Singh *et al.,* 2002). The physical encounters with conspecific females and/or their odour was observed to induce haploid oviposition producing male progeny (Decker *et al.*, 1993; Biswas and Singh, 1995b). Biswas and Singh (1995c) openioned that by having feminine stimuli (female odour) the females somehow 'estimate' the density of conspecific females in her vicinity and respond for optimal progeny sex ratio by increasing the male progeny in the population. The concentration of pheromones may help in estimating the number of males in the ambient environment of the ovipositing females. However, King (1989) and Wylie (1976) could not observe such effect of female odour on the progeny sex ratio in other groups of the parasitoids such as in case of *Spalangia cameroni* and *Nasonia vitripennis* (Hymenoptera: Chalcidoidea: Pteromalidae).

The results discussed so far demonstrate that the parasitoid densities influence the progeny yield as well as cause significant variation in the progeny sex ratio. The inversely female-density dependent progeny sex ratio indicates that for procuring maximum female progeny in the population for laboratory work or for mass culture, the ratio of female parasitoids to the hosts should not be limited. There should be about 100 hosts per female parasitoid in the mass culture programm.

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Speaking Up And Silencing Out In Networked Sphere On National Issues: A Content Analysis Of The Nigerian Global Awakening Day Online Protest Group

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Abstract: The 2012 Occupy Nigeria Protests which occurred after the decision of the Federal Government of Nigeria to remove fuel subsidy put Nigeria on global social media map; most especially Facebook which was explored by the civil society groups and human right activists across the country to campaign against the decision. During the protest, various socio-political movements emerged, calling government's attention to the impacts of the decision on the masses, and by extension the nation's economy, if eventually implemented. The groups that were formed then aimed at revealing varied consequences of the policy on the masses, which range from social to economic. The Nigerian Global Awakening Protest Day Group is an online protest platform created after the popular protests, demanding holistic approaches to various socio-economic and political problems in the country. It is against this background that this study investigated how actors and followers or bystanders of the group speak up and silent out on certain national issues through their posts and comments. The study employed content analysis as a main research design, while data gathered were analysed through descriptive and inferential statistics using the Statistical Package for the Social Science (PASW 18.0). Findings revealed that members of the group discussed poor leadership as an issue covertly (93.3%) and overtly (84.3%). Also, the study established that 9.0% of the members that commented on the analysed posts expressed their opinion overtly on a combination of corruption and poor leadership. Specifically, the study established no relationship between types of agenda set by members of the group and national issues they overtly expressed. However, there was a strong relationship between types of agenda created by 'actors' and national issues overtly expressed within the context of their posts.
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Key Words: National Issues, Speaking Up, Silencing Out, Covertly, Overtly, Nigeria

1.0   INTRODUCTION

Although the new and social media were in existence before the year 2009, their adoption for national and international protests became more evident and assumed a sporadic dimension as from that year. This is because right from year 2009, public and private institutions and individuals from varying walks of life have increased their use of social media to communicate, coordinate and monitor national and international issues (Mozorov, 2009a, cited by Segerberg and Bennett, 2011). Today, people talk about the new media revolution and the information age, driven by various information communication technologies. Communication is now online via social media which attract diverse players which range from individuals to organisations, contributors to followers, and even gatekeepers. With the help of social media, people with varying demographics meet online to exchange ideas and contribute to national and global issues, using a platform that breaks barriers associated with space and time.

Allan (2007:1836), citing Castel (2007) observes that "the diffusion of Internet, mobile communication, digital media, and a variety of tools of social software have prompted the development of horizontal networks of interactive communication that connect local and global in chosen time." According to Castel, today, ordinary citizens worldwide are using SMS, email, IPTV, video streaming, blogs, podcasts, wikis and so on, to build their own networked communities. Although the digital divide affects the capacity of developing countries to effectively exploit the opportunities provided by the new media technologies for development, millions of people in Nigeria are using mobile phones and other new media tools for development. One of these uses is the use of social media platform by the Nigerian Global Awakening Online Protest Group, an online social group that allows Nigerians to discuss and protest against constituted authorities and other concerned agencies, over various social, economic and political problems be-settling the nation.

The aim of the group is to prepare and mobilize citizens for a peaceful global protest by crying out to the world over the state of corruption, poverty, instability and gross insensitivity of political leaders to the plight of the citizens. The group seeks a nation where citizens enjoy good provision of

infrastructures and social amenities, good and affordable education, regulated religious activities and affordable housing. Furthermore, the group wants unbiased and accountable institutions to check corruption, eradicate poverty, promote rule of law and good governance, diversify the economy and consolidate democracy. Making a blind assumption about the factors that motivate members of this group to speak up on some national issues and be silent on some others, one can submit that the desire for a revolution, economic prosperity from poverty and political agenda are the motivating factors. Again, the type of agenda being created by this group when it engages national issues would provide a better understanding of the vision, mission and sentiments of the group. It is important to investigate the contribution that new and social media have made to the development of this group, and various national and global reawakening ideas that the group presents for sustainable national development, using the social media platform.

1.1   STATEMENT OF THE PROBLEM

The advent of the internet, and by extension social media, has revolutionized they ways citizenry of different nations in the world participate in governance. Social media have been used to mobilize citizens for and engage them in political activities ranging from online social movements to offline protests that had dethroned some authoritarian leaders. The Arab Spring of 2011 established the extent to which the masses can utilize the Information and Communication Technologies available to them in calling for social, political and economic changes in all ramifications. Before and since the spring, scholars in sociology, psychology, political communication, ICTs etc had researched and have been researching on the implications or effects of the new media technologies on the masses' calls for socio-economic changes and the recent global awakening cum political change (Khamis and El-Nawawy, 2012; Theocharis, Lowe, Deth and Albacete, 2013; Ibrahim, 2013). Stromer-Galley (2002) focused his study on analysis of interpersonal and online political talk in the public sphere. The researcher aimed at revealing the differences between people who talk about politics online and do not do face-to-face. Using secondary survey analysis to study the effects of political deliberation, the scholar reported political conversation behaviour of people online and offline. The study found that there are people who talk politics online, who do not do so in face-to-face interactions, and they are categorically different from those who do so face-to-face. Berdal (2004) focused his study on public deliberation on the web, using Habermas's inquiry and actor network

theory's propositions within the background of three selected major web forums: Spiegel Guardian Online Forum (SOF), Talk Debattcentralen within Theory (TDC) and The Unlimited of Conceptual Habermasian Actor-Network Terminology. Analysing the nature of these selected web forums, Berdal (2004) noted that the first and the second take up Habermas strict criteria of the Ideal Speech Situation (ISS), and raise questions on the extent to which the given forums live up to their ideals. The third one concerns public opinion formation, and asks to what extent the strength of the better argument may transmit from Web forums to decision-making institutions of societies like parliaments and governments. To attain the study's purposes, empirical inquiry, consisting online surveys, interviews and observations related to the identified Web forums, were adopted as methodology for the study. The study however revealed that web forums do promote and facilitate democratic deliberation, although not entirely without being exposed to coercions.

Joining the conversation, Dahlgren (2005) studied the internet within public spheres and political communication with a view to knowing their dispersion and deliberation. According to the researcher, the theme, 'the Internet and the public sphere', now has a permanent place in research agenda and in intellectual inquiry; it is entering the mainstream of political communication studies. The first part of the scholar's research was the analysis of the three main analytical dimensions of activities in public sphere: the structural, the representational, and the interactional. Then the study further addressed some central themes in the current difficulties facing democracy, refracted through the lens of the public sphere perspective. The study revealed that the concept of civic cultures offers an alternative way to understanding the significance of online political discussion. Expanding the discourse, Hara and Shachaf (2007), using the propositions and assumptions of collective action frame as a theoretical framework, analysed 17 Web sites of online Peace Movement Organizations (PMOs) in Japan and Israel, as a way of identifying the similarities and differences in the ways that online PMOs frame their activities. The study found that PMOs employed various strategies to develop resonance in communicating various messages on their web sites to the targeted audience. Cultural highlighting is one of these strategies that enable movement actors to hold other members' attention, especially bystanders.

Liu and Fahmy (2011) focused their study on the spiral of silence in virtual world, with the purpose of revealing individuals' willingness to

express personal opinions in online versus offline settings. This study extended the understanding of the spiral of silence theory by taking into account the impact of new media on virtual behaviour motivation. They found that when the likelihood of speaking out online increases, the likelihood of speaking up in a real setting also increases, and vice versa. The findings further established that the congruency of current opinions with one's own opinions predicts the willingness to speak out offline. Congruency of future opinions, however, failed to predict the likelihood of speaking out offline. Findings also indicated that congruency of future and current opinions did not predict the willingness to speak out in the online setting. The scholar concluded that while experiencing fear of isolation predicted the willingness to speak out online, it did not affect offline outspokenness.

Examining the role of social media in the 2011 Arab Spring using Egypt as his case, Storck (2011) studied the extent to which Egyptian activists used social media networks such as Facebook, Twitter, YouTube and weblogs as tools for organizing and generating awareness for political mobilisation, in the uprisings that took place in Egypt between January and February 2011. The propositions of two sociological theories were adopted as the basis for generating relevant research questions. These theories are: functionalist and network theories. Content analysis was adopted as the research design for examination of a cross-section of primary and secondary sources, which documented the events in Egypt both during the time of the uprising and after. From the analysis, the researcher found three identifiable trends: social media as an organisational tool, as an alternative press and outlet for citizen journalism, and finally as a tool for generating awareness both at regional and international levels.

Selecting Twitter, a social media platform used by Spanish, Greek, and American citizens for exchanging information, organising protest events, mobilizing participants and creating new, or supporting old, repertoires of engagement, Lowe, Deth and Albacete (2013) did a comparative examination of two critical research questions of the study: how did networking capacities offered by the internet were utilised to diffuse cross-national solidarity and allow high-threshold, old-fashioned social movement tactics, such as occupations, to become a tactic that surpassed borders?, and How common were the demands, practices, goals or political actions promoted by the three movements? Through propositions of action network theory, the study found that although Twitter is used significantly for protest information diffusion, calls

for participation are not predominant, while only a very small minority of tweets refers to protest organisation and coordination issues. Adding to this discussion, Ibrahim (2013) did a comparative analysis of Nigerian protesters' opinions on the removal of fuel subsidy in 2012 using online and offline protesters within the concept of networked and public spheres. The researcher found that there is a strong affinity between real public sphere and networked public sphere. Primarily, the study revealed that the socio-economic and political issues discussed by the online protesters motivated offline protesters during the protests. His study was based and tested on the propositions of social categories and perspective theories, while survey and content analysis were adopted as main research designs.

These studies have shown that Information and Communication Technologies (ICTs), and by extension social media, remain potent tools for effective participatory governance in all the continents. It also showed the extent to which the masses, minority groups and social movements can go in calling for good governance and institutionalization of social justice in all spheres of life. Suffice to note that none of the researchers known to the current researcher has explored why Nigerians speak up and silencing out on various national issues facing them in any social medium platform, and which were brought to the limelight during 2012 Occupy Nigeria protests (the protests that awaked citizenry for the collective actions toward good governance). The current study addresses the deliberation of members of the group under study on various national problems facing Nigeria. Basically, the study explores the posts and comments of the group focusing on how members converse on socio-economic and political issues with or without fear of being apprehend, and how they overtly express with or without sufficient information. This study seeks to answer these two questions: What categories of national issues do members of the Nigerian Global Awakening Day Online Protest Group overtly and covertly discuss? What types of agenda are being created by the members in relation with national issues they overtly discuss?

1.2   RESEARCH QUESTIONS
This study seeks to find answer to the following questions:

1. What categories of national issues do members of the Nigerian Global Awakening Day Online Protest Group overtly and covertly discuss?

2. What types of agenda are being created by the members in relation with national issues they overtly discuss?

Hypotheses

H_o: There is no relationship between types of agenda being created and national issues overtly express by actors of the group.

H_1: There is relationship between types of agenda being created and national issues overtly express by the actors of the group.

H_0: There is no relationship between types of agenda being created and national issues overtly express by the members of the group.

H_1: There is relationship between types of agenda being created and national issues overtly express by the members of the group.

2.0   LITERATURE REVIEW
2.1   GLOBAL   AWAKENING   AND NIGERIANS   QUEST   FOR   GOOD GOVERNANCE

In recent times, most of the masses in the developed and developing nations of the world have realized that there are some individuals or groups who usually derived delight in making life unbearable for the less privileged despite huge resources that abound in their domain. These individuals or set of groups are those who have socio-economic and political powers, believing that the best way to remain in 'the rich class' is to enslave others through various means such as draconian policies or programmes, self-imposition in terms of political leadership and so on. This observation leads to the concept of global awakening, a concept coined by Zbigniew Brzezinski. Operationalising the term, the proponent notes that for the first time in history, almost all of humanity is politically activated, politically conscious and politically interactive. Global activism is generating a surge in the quest for cultural respect and economic opportunity in a world scarred by memories of colonial or imperial domination (Marshall, 2010).

In Africa, recent political changes cum revolutions in some Arab nations have established the fact that Africans at home and in the Diaspora have realized that there is need for them to be awake to the institutionalization of good governance through a collective effort of utilizing necessary new media technologies, by identifying varied socio-economic and political problems, and priotising them in the minds of other citizens of the world. For centuries, issues of civil discourse only arose concerning written and oral communication. But now, new technologies for communication and social interaction, particularly social media, have dramatically expanded the potential for human interaction. They generate significant challenges for institutional policies and practices to encourage and sustain civil discourse for the critical social and

personal issues (Junco and Chickering, 2010). Contrasting new media technologies against traditional media, Storck (2011) observes that with a lack of truly independent and representative media, disenfranchised youths have searched for an alternative method of participating in the public and political spheres.

In Nigeria, the emergence of social media in 2004 ushered in facebook and has shaped socio-economic and political discussion among the citizens, especially those who are not digitally disadvantaged in terms of accessing various social networking sites for relevant information from 'guerilla self-mass communication' journalists. Different groups emerge with the aim of letting the masses know various problems confronting the nation. As faceless as most of these group are, many citizens do not usually boarder to verify the genuineness of the categories of information posted by 'administrators' and members of such groups before commenting on the information. Hindman (2008:3), making reference to Benkler, argues that "the Internet does not just place far more information in the hands of interested citizens; it transforms public debates by enabling online communities to use collaborative methods to create content, correct inaccuracies and send readers to the most insightful commentators". However, their requests have always been institutionalization of good economic and political governance, for rapid development in the country.

2.2 UNDERSTANDING COLLECTIVE ACTION FRAMES IN THE CONTEXT OF SOCIAL MOVEMENT

The idea of a group of people clamouring for political, social and economic changes are usually overtly expressed when the institutions that are expected to function maximally in all aspects of a society failed to do so. The group usually has different names to her credit. The nomenclature, however, depends on the nature and purposes of such a group or organization. In general term, a group calling for political, social and economic changes in a country is better known as social movement, believing that human being are social animal. Whether defined around gendered, ethnic, national, class, environmental or other interests, social movements have long been the carriers of liberation and social change (Hackett and Carroll, 2004). Arguing along this line, Simunovic (2012) notes that social movements have strongly emerged around the world in the last two decades as expressions of contextual and structural grievances. According to the scholar, these structural grievances are not given but are culturally, economically and environmentally mediated, and are dependent on how social

movements and the networks they are inserted create meanings and significations to explain reality. In Nigeria, the emergence of social movements could be traced to many years of perceived neglect of the South-south region, the region that provides the nation's main source of revenue since her independence in 1960. Having examined various problems facing the region, Late Ken Saro-Wiwa and other prominent human and social activists formed The Movement for the Survival of the Ogoni People (MOSOP) with the sole aim of organising the Ogoni people to demand "political autonomy within Nigeria" and bring world's attention to the group's conflict with the Nigerian state and Shell Oil Company. The movement recorded a number of successes before the extra-judicial killing of the leader, Ken Saro-Wiwa and some members by the Late General Sani Abacha. Apart from this group, other groups also emerged claiming marginalization of their regions by the Nigerian state. Oodua People's Congress (OPC) and Arewa Consultative Forum (ACF) in the South-Western and Northern parts respectively were also formed, calling for recognition by the state in terms of political, social and economic considerations.

It should be noted that these groups emerged when the country has not developed socially, economically and politically as they expect. They want the country to be developed apropos the huge resources available in all the regions. However, the campaign for social, economic and political changes shifted from regionalization to nationalization in 2012, when the country experienced another nationwide protest as they did against President Ibrahim Gbadamosi Babangida's Structural Adjustment Programme (SAP) in 1986. The 2012 protest was tagged "Occupy Nigeria". This was a protest that signified that the citizenry wanted social, economic and political changes by all means, due to government's decision to remove subsidy on petroleum products. For the actualization of their purposes, different groups or social movements emerged on social media identifying various issues and mobilizing citizens for protests in all the state capitals and towns. The Nigerian Global Awakening Protest Day on facebook is one of such social movements. The group is established with the philosophy that political leaders and other stakeholders in the Nigerian state have failed to turn things around for the masses in terms of providing basic social amenities and ensuring social justice cum rule of law in the country.

For its objectives to be achieved, members of the group deem it fit to discuss and comment on varied socio-economic and political issues ravaging the country. In the process of doing this, the issues are framed in such a way that the members would take decisive actions. In the words of Snow and Benford (2000:613) "movement actors are viewed as signifying agents actively engaged in the production and maintenance of meaning for constituents, antagonists and bystanders or observers". Thus, there are actors and followers or observers. Actors are those who post and comment with necessary information to call other members into action, while followers or observers would only post or comment in support of actors' messages without sufficient information. Snow and Benford observe that the context of social movement denotes an active and effective phenomenon that implies agency and contention at the level of reality construction. According to the scholars, it is active in the sense that something is being done, and effective in the sense of a dynamic, evolving process. It entails agency in the sense that what is evolving is the work of social movement organizations or movement activists. Furthermore, it is contention in the sense that it involves the generation of interpretive frames that not only differ from existing ones but may also challenge them. The resultant products of this framing activity is collective action frames, according to the scholars. Since social movements' members are working together with the aim of achieving common objectives, the frames will also be collective, except where there are bystanders. For the frames to be collective in its real sense, Snow and Bedford (2000) note that collective action frames are constructed in part as movement adherents negotiate a shared understanding of some problematic condition or situation they define as in need of change, make attributions regarding who or what is to blame, articulate an alternative set of arrangements, and urge others to act in concert to affect change. Suffice to say that since the rationale of the group (the researcher's emphasis) studied in this research is to remedy or alter some problematic situations or issues, it follows that directed action is contingent on identification of the source(s) of causality, blame, and/or culpable agents (Snow and Benford, 2000).

1.2   DISCUSSING NATIONAL ISSUES: A PROBE INTO ONLINE PUBLIC DELIBRATION

There is no nation in the world which does not have its peculiar socio-economic and political problems. These problems are usually occasioned by the inability of various institutions to function as expected by the citizenry. As soon as this is discovered by the citizenry, especially the masses, different deliberations would creep in from different stakeholders. The deliberations might take the form of individuality or collectivity. When it is

individuality, the person who is trying to call attention of the citizens to the inept institutions are usually known as activist, while the collectivity encompasses people of like minds with the sole aim of pulling all their resources together to awaken people and mobilize them for collective actions toward constituted authorities. However, the emergence of new technologies has revolutionized the thinking of many activists, be it individual or collective. New technologies such as internet, social media and other ICT tools have assisted social movement groups to cross-vitalise their ideas and mobilize their members for participatory actions in their respective countries. In Nigeria, 2012 Occupy Nigeria protests revealed the extent to which the masses can employ new media in rebuking government at all levels and political officeholders (Ibrahim, 2013). The Internet is becoming integrated with the established system of political communication, yet, it is also being used to challenge established power structures. Even the efforts of some more overtly authoritarian regimes around the world to curtail the democratic uses of the Net have not been fully successful, though inventories of the mechanisms of control are sobering (Dahlgren, 2005). Commenting on the interactivity of the Internet within the context of voicing one's opinion, Lusoli and Ward (2003:2) point out that: The interactivity of the Internet, in the form of email, discussion fora and live chartrooms provide the public with a range of additional channels to voice their opinions on issues. Political organisations can put large amounts of policy information/documents online and encourage feedback directly from members, supporters and the wider public.

It does seem to be the case that, for those who have access and political motivation, and who are living within open, democratic societies, the Internet offers very viable possibilities for civic interaction, but cannot clearly promise a quick fix for democracy (Dahlgren, 2005). Both proponents and critics of new digital media draw on models of a deliberative democracy that is "egalitarian, rational-critical and inclusive," in which people with diverse perspectives come together to address hard issues, and in which political leaders take seriously the public will expressed through such informed, reasoned discourse (Meraz, 2007). Since public and networked spheres are meant to help masses in voicing their opinions on a number of sundry issues that need urgent attentions from relevant stakeholders, there are basic dimensions to which their collective aims could be achieved, especially whenever they are facing stiff forces such as authoritarian leaders and their allies. Dahlgren (2005) reasons that structural, representational and interactional dimensions are analytical starting point for the public sphere of any given society or analyzing the contribution of any given communication technology. Thus, the three dimensions have the predisposition to assist members of any social movement group the opportunity of identifying an issue, framing and discussing it to the extent of calling for desired actions in line with the goals of issue being discussed.

Delineating the three dimensions, Dahlgren (2005) notes that the structural dimension comprises formal institutional features that direct public attention to classic democratic issues, such as freedom of speech, access and the dynamics of inclusion or exclusion. Emphasizing the efficacy of the structural dimension, the scholar stresses that a society where democratic tendencies are weak cannot give rise to healthy institutional structures for the public sphere, which in turn means that the representational dimension will be inadequate. With regard to the Internet, the structural dimension directs attention to the way in which the communicative spaces relevant for democracy are broadly configured. The representational dimension, on the other hand, entails the output of the media, the mass media as well as "mini-media" that target specific small groups via, for example, newsletters or campaign promotion materials. And given the increasing "massification" of communication on the Internet, representation becomes highly relevant for online contexts of the public sphere as well. Within this dimension, one can raise all of the familiar questions and criteria about media output for political communication, including fairness, accuracy, completeness, pluralism of views, agenda setting, ideological tendencies, modes of address, and so forth. Interaction actually consists of two aspects. First, it has to do with the citizens' encounters with the media—the communicative processes of making sense, interpreting, and using the output. The second aspect of interaction is the one between and among citizens themselves, which can include anything from two-person conversations to large meetings. To point to the interaction among citizens—whether or not it is formalized as deliberation— is to take a step into the social contexts of everyday life (Dahlgren, 2005).

3.0   THEORY/CALCULATION
3.1   AGENDA-SETTING THEORY

The agenda setting theory places emphasis on enlightened and educated media audiences that do not necessarily swallow and highly depend on the media. The mass media, as theorized by the apostles of the powerful effects theories, are capable of setting agenda or determining what the mass media audience think and act at a particular point in time. However, the basic assumption of agenda setting theory is that

in a modern democracy where the mass media are pervasive and can easily influence public opinion among the enlightened audience, they do not have the capacity to force their ideas on the audience, though they have the ability to focus public attention on specific events, issues and persons, in order to assign importance to them (Shaw, 1979). Instead of claiming a direct effect of media product on audience's attitudes and behaviours, the agenda setting theory is noted for what media do for people and not what they do to people. Therefore, members of the audience know what they want, what to select and how to use them (Katz, Blumer, Gurevitch, 1974; Shaw and McCombs, 1977).

Therefore, in a network agenda, a member of a network can raise an issue or issues to be discussed by the other members. Whether positive or negative, the contributions of members of that network form the agenda of the group, and their viewpoints through their medium, can possibly raise public awareness and discussion concerning the subject. Consider the Arab Spring as an example. Members of different social groups online used their twitter, facebook and other social media accounts to set agenda for their respective groups, which invariably entered public domain and became a national pool of public opinion on the socio-political and economic development of the Arab States.

1.3   SPIRAL OF SILENCE THEORY

Every human being wants to be respected and heard in the society. There is a growing belief in communal and group commonalities, even in a highly materialistic and individualistic world. Humans are gregarious, we usually want to associate and contribute to societal development by belonging to one group or the other (nobody wants to be a lone ranger). Therefore, there is a possibility that opinions of a dominant group would be recognized as valid and important above the opinions of a person or a minority. The spiral of silence theory holds that people appeal to and flow with a popular public opinion than what a minority group says. As a result of this, people try to avoid isolation by conforming more out of a desire to identify with a winner. According to Griffin (n.d:376), Noelle Neumann predicts that Individuals who…. notice that their own personal opinion is spreading and is taken over by others, will voice this opinion self-confidently in public. On the other hand, individuals who notice that their own opinions are losing ground will be inclined to adopt a more reserved attitude. This is because most people are afraid of becoming isolated from their environment and they constantly observe their environment closely before they comment on public issues. They first of all investigate the opinions and modes of behaviour that are relevant and popular

among the people, and they align themselves accordingly with the public agenda. Therefore, if there is a prevailing public opinion, an individual will have the willingness to speak out, and such a person will be silent if his or her idea is a minority viewpoint, and there is a perceived discrepancy to the general public opinion.

4   METHODS AND MATERIALS

For the attainment of the study purpose, the researcher adopted content analysis, a quantitative research design, for the generation of necessary data. This method has been described as a research design that enables researchers to analyse the latent and manifest contents of any written medium of communication, be it mass communication or new media technologies such as facebook, twitter, blog etc (Nwabueze and Edegoh, 2010). The posts and comments of the members of the chosen online protest group: The Nigerian Global Awakening Protest Day constituted the population of the study. The group had 8, 260 members and 4 administrators as at the period of conducting this study. The posts and comments that had socio-economic and political issues undertone were purposively selected as representative samples. The members' posts were regarded as messages from 'actors' to the followers or bystanders, and vice versa. Thus, a post was analysed as a message from an actor, a member who initiated discussion on national issues, and commented on by other members. Other members in this situation were those who followed the post by following the actor with additional information, and those that disagreed with the substance of the post, that is those who expressed contrary opinion (these members are referred as bystanders). In a nutshell, actors' and followers' posts and comments were analysed apropos the study's purpose. It should be noted that posts and comments were generated by copying and pasting in a Microsoft word document and later analysed through PASW 18.0 Software Package for the Social Sciences (SPSS). Specifically, inferential and descriptive statistics were used to analyse the data generated in line with the study's research questions and formulated hypothesis. The quantitative findings were however supported with relevant quotes from some of the posts and comments of the members of the group.

Content categorization

It is imperative to delineate the formulated content categories designed for the research questions that guided and assisted the researcher in collecting relevant data for the study. These categories are:

a.   Overtly Expressed National Issues (OENI)

These are socio-economic and political issues identified, posted and commented on by active members of the group with sufficient information

based on their knowledge of the issues. In a nutshell, the category entails the extent to which members of the group 'speak up' on certain national issues, which is willingness to express their opinions without fear of being apprehended. The specific issues examined under this category include insecurity, corruption, poor policy implementation, unemployment, infrastructural decay, electoral fraud and poor leadership.

b.   Covertly Expressed National Issues (CENI)

These are socio-economic and political issues identified, posted and commented on by active members of the group without sufficient information on the issues. In a nutshell, the category entails the extent to which members of the group 'silent out' on certain national issues, which is unwillingness to express their opinions for fear of reprimand. The specific issues examined under this category include insecurity, corruption, poor policy implementation, unemployment, infrastructural decay, electoral fraud and poor leadership.

c.   Transformation Agenda

This entails posts and comments of the members of the group under study that focused on the need for the government at all levels and other concerned stakeholders in the Nigerian state to approach the issues overtly expressed with holistic measures. These measures encompass strengthening anti-corruption and security agencies, creation of enabling environment for foreign and local investors, provision of qualitative and necessary social amenities, implementation of relevant policies formulated to the letter, ensuring independence of the electoral body (INEC), uphold of social justice and rule of law at all levels of government and resisting the temptation of highly monetised electoral process by the citizenry.

d.   Revolution Agenda

This contained members' posts and comments that called for fundamental changes in the nation's organizational and political structures by all means, believing that when it happened, in-coming generations in the country would live a qualitative life in terms of having better social, political and economic structures at all levels of governance.

e.   Protest Agenda

This highlights members' posts and comments that called for peaceful protests as the main opportunity of letting government at all levels know the extent to which the masses are suffering due to socio-economic and political issues identified, posted and commented on across the country.

5   RESULTS AND DISCUSSION

In line with the purpose and research design adopted for this study, 100 posts of the selected group that were purposively chosen resulted to 134 national issues each for both issues overtly and covertly expressed by members of the group. This gave a total of 268 national issues discussed by actors and followers, and by extension bystanders. Suffice to note that the selected 100 posts generated a total of 149 comments from members as at the period of gathering data from the group's wall page. These data provided the opportunity of explaining why actors and members of the group 'speak up' and 'silent out' on certain national issues or problems in the country. Therefore, various findings generated for the formulated research questions and hypotheses are discussed below in relation with the conceptual and theoretical framework reviewed for the study.

Research Question One: What categories of national issues do members of the Nigerian Global Awakening Day Online Protest Group overtly and covertly discuss?

Since the group's aim is to create awareness for Nigerians at home and in the Diaspora on certain national issues or problems that need holistic approaches from concerned stakeholders, the researcher deemed it fit to examine national issues overtly and covertly discussed by members through this research question. The national issues examined using this question include: insecurity, corruption, poor policy implementation, unemployment, infrastructural decay, electoral fraud and poor leadership. The findings are interpreted and illustrated below with relevant quotes from the group's wall page.
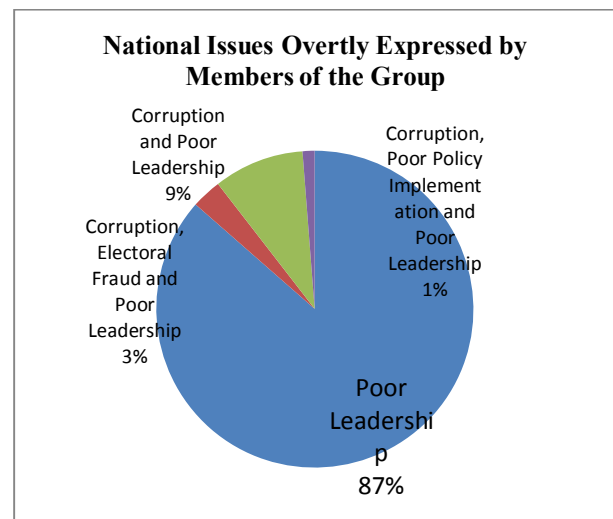

Figure 1: National Issues Overtly Expressed by Members of the Group

According to the information contained in figure 1 above, it is clearly established that majority of the members (n=113, representing 84.3%) provided sufficient information on poor leadership as a national issue in Nigeria that should be addressed by all the stakeholders in the democratic and non-democratic institutions. This is significant enough considering different socio-economic and political problems affecting the country which are usually adduced to incompetence and lack of vision of the past and present political leaders. Out of total members (n=134) that commented overtly on identified national issues, 12 (representing 9.0%) also provided necessary information on *corruption and poor leadership* as major obstacles facing the Nigerian-state, calling for urgent attention from the concerned authorities.
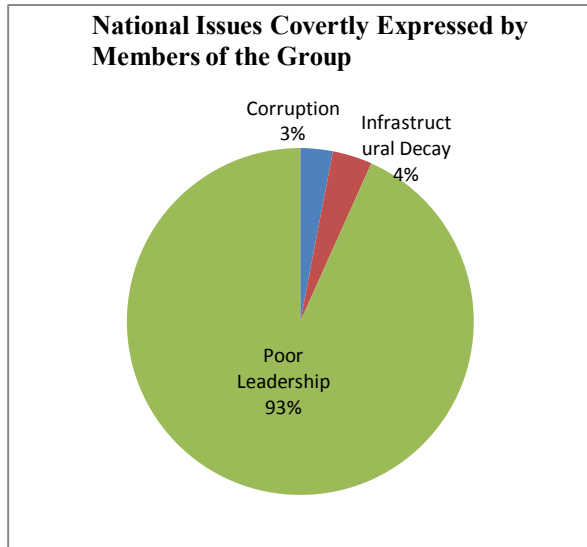

Figure 2: National Issues Covertly Expressed by Members of the Group

Figure 2 indicates categories of national issues covertly expressed by members of the group. One hundred and twenty-five members (amounting to 93.5%) did not provide adequate information on poor leadership as the main problem facing the country. This might be connected with the fact that they do not have genuine information regarding the issue or fear of being tracked down by 'government's spies,' for providing such information that may help other members in uniting against government at all levels. As a matter of fact, members of the group are more willing to express their views on poor leadership covertly than doing it overtly. These findings could be more understood through some of the posts of the group supplied inter alia:

Comment 1: *We never had a good leader right from the beginning. Even most of us still wont (sic) be good leader.selfish .hearless (sic) individual we r.thats (sic) d (sic) truth.*
Comment 2: *We have said that all these Nigerian parties are full of rogues, but some pple (sic) will be seling(sic) parties' .I think only PDP legislators collect this inhuman wages!*

From the comments above, it could be inferred that members that expressed their views failed to include adequate information capable of engendering other members' contribution to the issue being discussed. For instance, the writer of comment 2 did not actually know whether PDP legislators collected what he described as inhuman wages. This is established with the phrase, 'I think'. The finding is in consonance with Griffin's position on Noelle Neumann's spiral of silence theory that individuals who notice that their own opinions are losing ground will be inclined to adopting a more reserved attitude. This is because, most people are afraid of becoming isolated from their environment and they constantly observe their environment closely before they comment on public issues. They first of all investigate the opinions and modes of behaviour that are relevant and popular among the people, and they align themselves accordingly with the public agenda. The finding also corroborates Snow and Bedford's view (2000) on the collectivity of social movement's members while discussing an issue. The scholars note that collective action frames are constructed in part as movement adherents negotiate a shared understanding of some problematic condition or situation they define as in need of change; they make attributions regarding who or what is to blame; they articulate an alternative set of arrangements, and urge others to act in concert to affect change.

Research Question Two: What types of agenda are being created by the members in relation with national issues they overtly discuss?

This research question was formulated with a view to revealing the kinds of agenda being set by members of the group in the course of commenting overtly on the examined national issues. From the findings sought for research question one, the researcher can keenly note that poor leadership is the most national issue overtly expressed by the members. Based on this, figure 3 below contains data that established the kinds of agenda considered for the identified national issue.
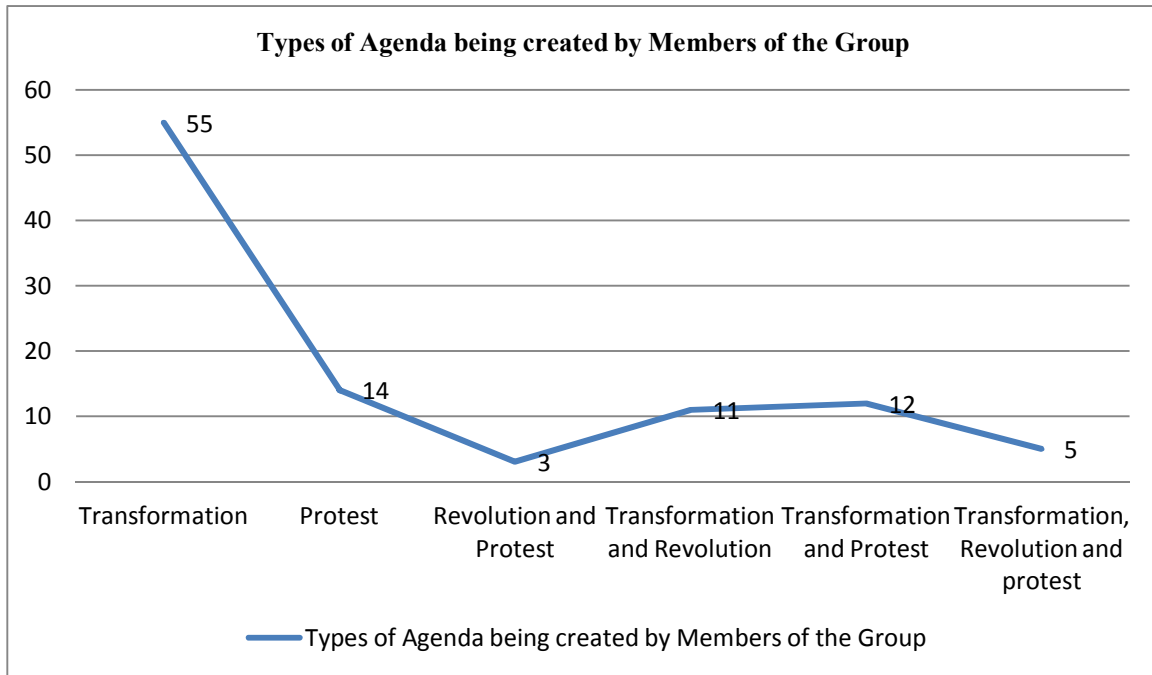
Figure 3: Types of Agenda Set by Members of the Group apropos National Issues Overtly Expressed

Figure 3 above shows trends in the agenda being created by members of the group in consonance with the main national issue (*poor leadership)* posted by the actors (those that actively initiate discourse on the examined national issues). From the figure, it could be deduced that transformation is being established as main solution to *poor leadership*, and in some cases, to other issues. Apart from the transformation agenda, 14.0% also considered protest as part of agenda that must be embraced by the citizenry. This is established by 55 comments of some members which amounted to 55.0% of the total comments (n=134) analysed for the study. The finding could be more understood considering excerpts provided inter alia:

Comment 3: *Some Nigerians are gullible and dis (sic) failed govt (sic) will get them a bait come 2015.*
Comment 4: *...will we still fold our hands and look at it this way? Hey our unborn children will curse us if we don't try and put a stop to this.*
Comment 5: *...remember, it is your right to ask for good governance and sustainable development. Keep asking and don't be quiet. Government is tangible and visible.*
Comment 6: *...all these leaders with principles of "Cover-My-Dirty-Yash" at all cost must sit down this time around. People should think, think and think. No more sentimental decisions at all.*

Comments 3 and 6 indicate transformation agenda, calling attention of the citizenry to the need to jettison 'monitised electoral system' associated with the Nigerian politics, while 4 and 5 are calling for protest in the real public sphere against perceived poor leaders in the country. It could be said that the group is not against the constituted authorities, but it is calling for good governance at all levels that would transform the entire nation in line with the available human and material resources. This finding agrees with Katz and Blumer, Gurevitch's (1974) and Shaw and McCombs' (1977) position on agenda-setting theory that members of the audience know what they want, what to select and how to use them. The finding also supports the assertions of Hindman (2008) and Junco and Chickering (2010). Hindman was of the view that Internet does not just place far more information in the hands of interested citizens, it transforms public debates by enabling online communities to use collaborative methods to create content, correct inaccuracies and send readers to the most insightful commentators. To Junco and Chickering, new technologies for communication and social interaction, particularly social media, have dramatically expanded the potential for human interaction. The scholars observed that they (social media) generate significant challenges for institutional policies and practices to encourage and

sustain civil discourse for the critical social and personal issues.

Hypothesis Testing 1

H$_o$: There is no relationship between types of agenda being created and national issues overtly expressed by actors of the group.

H$_1$: There is relationship between types of agenda being created and national issues overtly expressed by the actors of the group.

Table 1: Relationship between Types of Agenda Set by Actors and National Issues Overtly Expressed Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	211.150[a]	90	.000
Likelihood Ratio	171.882	90	.000
Linear-by-Linear Association	12.214	1	.000
N of Valid Cases	100		

a. 110 cells (98.2%) have expected count less than 5. The minimum expected count is .03.

The Chi-Square value of 211.150 at 90 degrees of freedom is significant at 0.000. Thus, the alternate research hypothesis is supported. The null hypothesis is therefore rejected while the alternate hypothesis is accepted meaning that there was statistical significant relationship between types of agenda being created and national issues overtly expressed by the actors of the group.

Hypothesis Testing 2

H$_0$: There is no relationship between types of agenda being created and national issues overtly expressed by members of the group.

H$_1$: There is relationship between types of agenda being created and national issues overtly expressed by members of the group.

Table 2: Relationship between Types of Agenda Set by Members of the Group and National Issues Overtly Expressed Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.781[a]	42	.524
Likelihood Ratio	30.144	42	.914
Linear-by-Linear Association	.425	1	.514
N of Valid Cases	61		

.9%) have expected count less than 5. The minimum expected count is

The Chi-Square value of 40.781 at 42 degrees of freedom is not significant at 0.524 for the types of agenda being created and national issues overtly expressed by members of the group. Thus, the null research hypothesis is supported; there was no statistical significant relationship between the types of agenda being created and national issues overtly expressed by members of the group.

6   CONCLUSIONS AND RECOMMENDATIONS

The study has established that there is a room for collective deliberation on certain national issues on social media that are germane to the sustainability of an ideal nation, especially in third-world regions (such as Asia, Africa etc) where the real democracy is probably still elusive. The research has revealed the extent to which 'actors' in an online social movement can influence their followers or bystanders towards contributing to discussions on specific and crucial national issues. The study has specifically found that there is no relationship between types of agenda set by members of the group and national issues they overtly expressed. However, there is a strong relationship between types of agenda created by 'actors' and national issues overtly expressed within the context of their posts. In the light of this and the data gathered, the following

recommendations are proffered for the beneficiaries of the study:

1.   The Nigerian government should ensure true transformation of all the sectors of the country. Especially, dividends of democracy should be evenly distributed across the country. This will go in a long way in averting forceful protests that might occur in the future.

2.   Nigerians in the real public sphere should emulate the collective deliberation zeal of members of the group by exploring various conventional media for the discussion of germane national issues. This will resulted to collective attention calling of the concerned stakeholders in the country, to the critical sectors that need urgent attention.

3.   The coordinators of the group should draw a strategic document that will assist government at various levels in tackling specific problems identified and discussed.

4.   Civil society groups in the real public sphere should emulate The Nigerian Global Awakening Protests Day Group's objectives and philosophy of reinforcing various national issues examined through different and available conventional media or integrated mass communication strategy.

5.   Coalition of civil societies in the country should organize enlightenment programmes on the use of social media for political participation and mobilization against policies that would not benefit the majority, especially the masses. The programmes should be targeted at the youths who have become net-generation through the emergence of new media.

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