A Theoretical Approach to the System of Transmission of *Hadīth* Based on Probability Calculations

"Hadis Rivayet Sistemine İhtimal Hesapları Merkezli Teorik bir Yaklaşım "

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Özet: Hadis ilminde bir râvi için kullanılan sika, mutkin, adl, sadûk, metrûk, zayıf… vb. tabirlerin her biri, nâkilin rivayetlerindeki güvenilirlik derecesini anlatan terimlerdir. Hadisler hakkında verilen sahih, hasen, zayıf... gibi hükümler ise, hadisin Hz. Peygamber'e aidiyet ihtimâlinin kuvvetini beyan eden sözel değerlendirmelerdir. Muhaddisler bir hadis hakkında hüküm verirken o hadisi aktaran nâkillerin rivayet etmedeki genel tutarlılıklarını ve hadisin bütün tariklerini dikkate alıp, gâlib zanna göre bir hükme varmışlardır. Bu makalede, gerek râvilerle ilgili derecelerin gerekse hadislerle ilgili hükümlerin rakamsal değerlerinin ortaya çıkarılmasını mümkün kılacak ve herhangi bir hadisin en muhtemel formatını belirlemeye yardımcı olacak teorik bir model ileri sürülmüştür.

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Anahtar kelimeler: Rivayet, isnad, hadis, ihtimal hesapları, matematiksel analiz.

INTRODUCTION

Transmission of knowledge through reliable ways from a person to another, from one generation to another is very important not only for human relations but also for revelation. It becomes more important especially when it concerns authentication of the sayings of prophets who are given revelations. Similarly, in our daily life, people are graded between 0 % and 100 % with regard to their veracity based on the truthfulness of the way they transmit knowledge and they describe events. Consequently, it is possible to say that in order for one to be peaceful, one must earn the trust of the society in which one lives. In the same vein, one of the means to earn the trust of the society is to transmit accurately. Faithfulness to transmission is the constitutive element of the line of integrity, which begins with transmitting (describing) an event one witnesses in the manner that conforms to what really happens and which

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turns in time to the character trait the possessor of which expresses his feelings in the manner he feels. Nevertheless, even if one's custom of reporting things in the manner they happen becomes a character trait, it is probable that men[1] may not behave coherently when transmitting something. This probability can be measured by checking transmissions of one and the same individuals at different times. The truth coefficient of a person, which is based on experiences throughout a period of time and which is quantified, is expressed via the terms 'extremely reliable,' 'moderately reliable' and 'less reliable'. Throughout this article, which attempts to establish the reliability of men/transmitters in theoretical terms, the coefficient in question is calledη.

Since the reliability coefficient (η) of people who have never made accurate transmission is low, the wrong transmissions they make do not cause any serious problem. Consequently, even people with ulterior motive, who expect a huge benefit by making inaccurate transmissions, need to earn the trust of the society by being faithful in their transmission for a while. From this viewpoint, we may say, the probability of one's making an accurate transmission is higher than the probability of one's making an inaccurate transmission.

KINDS OF TRANSMISSION

There are two alternatives regarding the case of a transmitter whose veracity is not known: (i) he may transmit accurately, or (ii) he may transmit inaccurately.

(i) Accurate transmission: It is the case, if a transmitter relates in accordance with matters of fact for various reasons such as religious reasons, human dignity, sense of truth, integrity and honor etc. Although there may be many reasons explaining why one makes transmissions in accordance with reality, there is one single way to transmit a speech or description of an event in accordance with reality. We symbolize this way by the letter 'T' in the probability tables given below. On this definition, that a person makes an accurate transmission concerning an event means that the information this person gives in the transmission he makes is true. Consequently, in the tables of probability, when a transmitter is assigned the value 'T' it means that the report given via his transmission is true. This follows from the above-mentioned definition.

(ii) Inaccurate transmission: It is the case, if a transmitter does not transmit accurately for any kind of reason, which may be reduced to acquiring an

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1 A believer in God is the one who also believes that God, the exalted, does not relate anything contrary to facts. Indeed, God, the exalted, assured the truth of his revelation through his truthful and credible (masduq) prophets. Hem kept them away from inaccurate transmission, although they are human beings.

interest. Indeed, unlike making an accurate transmission, there are uncountably many ways in which one may transmit something inaccurately. Precisely speaking, in this study, an inaccurate transmission indicates the case that one person relates an event he witnesses in a manner that either partly or wholly deviates from what occurred, and the case in which one relates an event that he has not witnessed as if he has witnessed. It is symbolized in the probability tables by the letter 'F'.

'Inaccurate transmission,' which we are talking about, and 'inaccuracy of transmission' mean different things. We must underline the difference between these two. Whereas an 'inaccurate transmission' is kind of transmission and an action, the 'inaccuracy of transmission' means that the transmitted report is inaccurate. The fact that a person makes an inaccurate transmission, i.e., F, does not mean that the information he transmits is inaccurate every time. This is because, although a transmitter may transmit a report of an event he does not witness, the report, considered independent of the situation of the transmitter, may be true or false.

On the basis of the definition above, for any transmission with the truth values 'F' there are two probabilities:

1) F_1: a transmitter reports an event he witnesses with either partial or complete distortion. If F_1 is true of a transmitter, the report he transmits is considered *inaccurate*.

2) F_2: a transmitter transmits a report of an event that he has not witnessed as if he has. This kind of transmission is divided into two:

a) F_{2a}: a transmitter transmits an inaccurate report of an event as if he has witnessed the event, although he has not witnessed it. If F_{2a} is true of a transmitter, then the report he transmits is considered *inaccurate*.

b) F_{2b}: a transmitter transmits an accurate report of an event as if he has witnessed the event, although he has not witnessed it. This kind of transmission, in turn, is divided into two:

i) F_{2f}: a transmitter transmits an accurate report of an event he has not witnessed both distorting the report and claiming that he witnessed the event. If F_{2f} is true of a transmitter, the report he transmits is considered *inaccurate*.

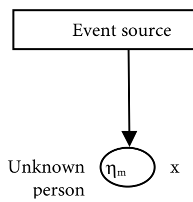
ii) F_{2t}: a transmitter transmits an accurate report of an event he has not witnessed accurately but claiming that he witnessed the event. If F_{2t} is true of a transmitter, the report he transmits is considered *accurate*.

PRINCIPLE

A mentally healthy person can choose to make accurate or inaccurate transmission each and every time. Although external factors may influence such a person in the positive or negative direction, none of them necessarily determines the result of any specific transmission he makes. One may choose, at the last minute, to transmit accurately, even if it costs him his life. None of the external factors can have the full control of the decision which a mentally sound person makes. This is why, in the probability calculation, external factors are not considered efficient either in the positive or in the negative manner, i.e., they insure neither 'accurate transmission,' nor 'inaccurate transmission.' Accordingly, generally speaking in this study, I assume that any transmitter decides via his free will when transmitting a report either accurately or inaccurately.

There may be so many reasons pushing a transmitter to make transmissions inaccurate, just as there may be so much of them pushing him to make transmissions accurate. However, it is open to discussion whichever we consider to be more efficient, more realistic and more influential on people. Consequently, in the case of men of whom we do not know anything, I assume that the reasons leading a person to transmit accurately and the reasons leading him to transmit inaccurately are equally and identically realistic. This is why; the probability that such a person makes 'accurate transmissions' and the probability that he makes 'inaccurate transmissions' are assumed to be equal. Consequently, in this study, the reliability coefficient of an unknown person, i.e., a person whose properties we do not know is assumed to be 50 %. That is: $\eta_m = ½$.

TRANSMISSION BY AN UNKNOWN PERSON



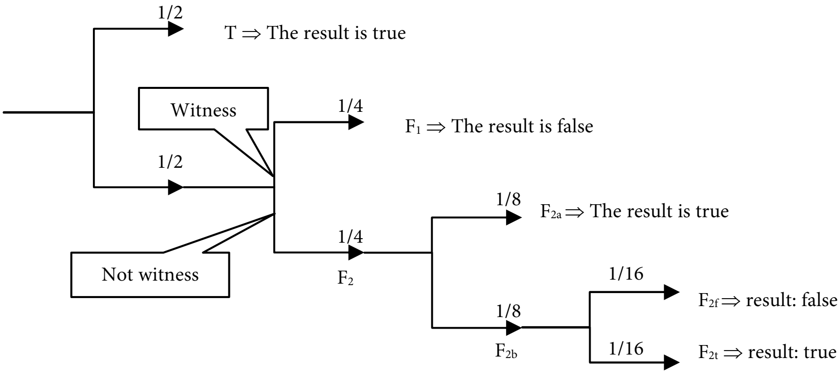
Let us suppose that an unknown person, x, transmitted a report to us. Since we do not know anything about this person, in this study we assume, the probability that he transmits accurately is equal to the probability that he transmits inaccurately. Since there is no evidence indicating that his transmission is 'accurate,' or 'inaccurate,' both of the following probabilities are equally applicable to this person:

Probability Table

	x	**Kind of transmission**
1. probability	T	Accurate transmission
2. probability	F	Inaccurate transmission

According to the first probability, x makes an accurate transmission. By definition, that x probably transmits accurately is the same as that the report transmitted by x is probably true. Thus, the report on this probability is accurate.

According to the second probability, x makes an inaccurate transmission. In this case, F_1 and F_2 are taken into account:



On this account there are 16 cases of probability, 9 of which are true, and 7 of which are false. Therefore the probability of the accuracy of this transmission that x makes is:

ω_x = the total number of the probabilities of accurate reports/ total number of probabilities = δ / ε.

$\omega_x = \delta / \varepsilon = 9/16$

The probability of the inaccuracy of this transmission that x makes is:

ϖ_x = the total number of probabilities of inaccurate reports/ total number of probabilities= φ / ε.

$\varpi_x = \varphi / \varepsilon = 7/16$

$\omega_x + \varpi_x = \delta / \varepsilon + \varphi / \varepsilon = 9/16 + 7/16 = 16/16 = 1$

As it can be clearly understood from the values given in this formula, in this transmission F_{2t}'s effect in this result is 1/16. This value is the maximum value that F_{2t} can be assigned. For example, the effect of F_{2t} in the same transmission by two unknown (unidentified) persons is 1/64, and it is 5/144 in two different transmissions by two unknown persons. The more the number of transmitters is, the closer the effect of F_{2t} comes to zero. In the rest of this study, intending to simplify the calculation of probability, I *ignore* this effect of F_{2t}. However, it will be taken into account in other studies, later on, when this model is applied to prophetic traditions.

If the transmission mentioned above is examined without F_{2t} being taken into account the result will be:

Probability Table

	x	**Result**
1. probability	T	Accurate transmission
2. probability	F	Inaccurate transmission

The probability of x's making an accurate transmission regarding this report= total number of probabilities of accurate transmission/ total number of probabilities.

There is a positive correlation between the probability of the fact that x makes an accurate transmission and the probability of the fact that the transmission is accurate.

Therefore, the probability of the accuracy of the transmission that x makes is:

ω_x = the total number of probabilities of accurate transmissions/ the total number of probabilities = δ / ε.

$\omega_x = \delta / \varepsilon = 1/2$

The probability of the fact that x makes an inaccurate transmission regarding this report= the total number of probabilities of inaccurate transmissions/ the total number of probabilities.

There is a positive correlation between the probability of the fact that x makes an inaccurate transmission and the probability of the fact that the transmission is inaccurate.[2]

Therefore the probability of the inaccuracy of this transmission that x makes is:

ϖ_x = the total number of probabilities of inaccurate transmissions/ the total number of probabilities = φ / ε.

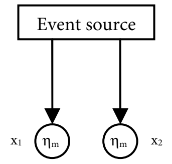
$\varpi_x = \varphi / \varepsilon = 1/2$

$\omega_x + \varpi_x = \delta / \varepsilon + \varphi / \varepsilon = 1/2 + 1/2 = 2/2 = 1$

2 F_{2t}'s effect is ignored.

TRANSMISSION BY TWO UNKNOWN PERSONS

i) Two Similar Transmissions by Two Unknown Persons



x_1 and x_2 are two people who relate the same event with the form x.

Probability Table

	x_1	x_2	**Result**
1. probability	T	T	True
2. probability	T	F	True
3. probability	F	T	True
4. probability	F	F	False

On the <u>first probability</u>, x_1 and x_2 make accurate transmissions. Thus the report is accurate.

On the <u>second probability</u>, x_1 makes an accurate transmission and x_2 makes an inaccurate transmission.[3] The report is accurate in this case as well, because x_1 makes an accurate transmission.

On the <u>third probability</u>, x_2 makes an accurate transmission and x_1 makes an inaccurate transmission.[4] The report is accurate in this case too, because x_2 makes an accurate transmission.

On the <u>fourth probability</u>, both x_1 and x_2 make inaccurate transmission. In this case, the report is inaccurate.[5]

The probability of accuracy of the transmission made by x_1 and x_2 concerning the same event:

ω_x = the total number of probabilities of accurate transmissions/ the total number of probabilities = δ / ε.

$\omega_x = \delta / \varepsilon = 3/4$

The probability of the inaccuracy:

ϖ_x = the total number of probabilities of inaccurate transmissions/ the total number of probabilities = φ / ε.

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3 Although the report x_2 transmits is accurate, since he is not the witness of the event, the kind of transmission, which he claims to make, is not accurate.

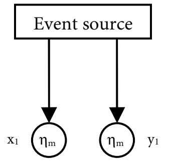
4 Although the report x_1 transmits is accurate, since he is not the witness of the event, the kind of transmission, which he claims to make, is not accurate.

5 The effect of F_{2t} is ignored.

$\varpi_x = \varphi / \varepsilon = 1/4$

$\omega_x + \varpi_x = \delta / \varepsilon + \varphi / \varepsilon = 3/4 + 1/4 = 4/4 = 1$

ii) Two Dissimilar Transmissions of Two Unknown Persons



Concerning the same event,

x_1 is the person who relates the event in the form of x.

y_1 is the person who relates the event in the form of y.

Probability Table

	x_1	y_1	Result
1. probability	T	T	Θ
2. probability	T	F	Form x is true
3. probability	F	T	Form y is true
4. probability	F	F	Both forms are false

Θ: is not a probable alternative.

The probability of the accuracy/truth of the transmission with the form x is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$\omega_x = \delta_x / \varepsilon = 1/3$

The probability of the inaccuracy/false of the transmission with the form x is:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission/ the total number of probabilities = φ_x / ε

$\varpi_x = \varphi_x / \varepsilon = 2/3$

$\omega_x + \varpi_x = \delta_x / \varepsilon + \varphi_x / \varepsilon = 1/3 + 2/3 = 3/3 = 1$

The probability of the accuracy/truth of the transmission with the form y is:

ω_y = the total number of probabilities of the transmission in the form y to be the accurate transmission / the total number of probabilities = δ_y / ε

$\omega_y = \delta_y / \varepsilon = 1/3$

The probability of the inaccuracy/false of the transmission with the form y is:

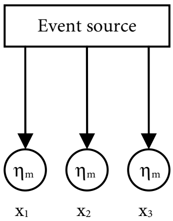
ϖ_y = the total number of probabilities of the transmission in the form y to be an inaccurate transmission/ the total number of probabilities = φ_y / ε

$\varpi_y = \varphi_y / \varepsilon = 2/3$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1/3 + 2/3 = 3/3 = 1$

TRANSMISSION BY THREE UNKNOWN PEOPLE

i) Similar Transmissions by Three Unknown People



x_1, x_2 and x_3 are three people relating an event with the form x.

Probability Table

	x_1	x_2	x_3	Result
1.Probability	T	T	T	True
2.Probability	T	T	F	True
3. Probability	T	F	T	True
4. Probability	F	T	T	True
5. Probability	T	F	F	True
6. Probability	F	F	T	True
7. Probability	F	T	F	True
8. Probability	F	F	F	False

The probability of the accuracy of the transmission with the form x made by x_1, x_2 and x_3 of one and the same event is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$\omega_x = \delta / \varepsilon = 7/8$

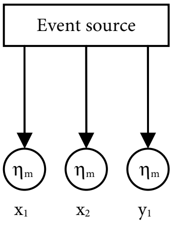
The probability of the inaccuracy:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission / the total number of probabilities = φ_x / ε

$\varpi_x = \varphi / \varepsilon = 1/8$

$\omega_x + \varpi_x = \delta / \varepsilon + \varphi / \varepsilon = 7/8 + 1/8 = 8/8 = 1$

ii) Two of Three Unknown People Make Similar Transmissions, and the Third Makes a Different One



Concerning the same event,

x_1 and x_2 are two unknown transmitters who relate the event in the form x.

y_1 is an unknown transmitter who relates the event in the form y.

Probability Table

	x_1	x_2	y_1	**Result**
1. probability	T	T	T	Θ
2. probability	T	T	F	Form x is true
3. probability	T	F	T	Θ
4. probability	F	T	T	Θ
5. probability	T	F	F	Form x is true
6. probability	F	F	T	Form y is true
7. probability	F	T	F	Form x is true
8. probability	F	F	F	Both forms are false

Θ is not a probable alternative.

The probability of the accuracy/truth of the transmission with the form x is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$\omega_x = \delta_x / \varepsilon = 3/5$

The probability of the inaccuracy/false of the transmission with the form x is:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission/ the total number of probabilities = φ_x / ε

$\varpi_x = \varphi_x / \varepsilon = 2/5$

$\omega_x + \varpi_x = \delta_x / \varepsilon + \varphi_x / \varepsilon = 3/5 + 2/5 = 5/5 = 1$

The probability of the accuracy/truth of the transmission with the form y is:

ω_y = the total number of probabilities of the transmission in the form y to be the accurate transmission / the total number of probabilities = δ_y / ε

$\omega_y = \delta_y / \varepsilon = 1/5$

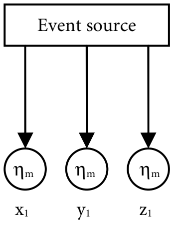
The probability of the inaccuracy/false of the transmission with the form y is:

ϖ_y = the total number of probabilities of the transmission in the form y to be an inaccurate transmission/ the total number of probabilities = φ_y / ε

$\varpi_y = \varphi_y / \varepsilon = 4/5$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1/5 + 4/5 = 5/5 = 1$

iii) Three Unknown People Have All Different Transmissions



Concerning the same event,

x_1 is an unknown transmitter who relates the event in the form x.

y_1 is an unknown transmitter who relates the event in the form y.

z_1 is an unknown transmitter who relates the event in the form z.

Probability Table

	x_1	y_1	z_1	**Result**
1. probability	T	T	T	Θ
2. probability	T	T	F	Θ
3. probability	T	F	T	Θ
4. probability	F	T	T	Θ
5. probability	T	F	F	Form x is true
6. probability	F	F	T	Form z is true
7. probability	F	T	F	Form y is true
8. probability	F	F	F	All forms are false

Θ is not a probable alternative.

The probability of the accuracy/truth of the transmission with the form x is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$\omega_x = \delta_x / \varepsilon = 1/4$

The probability of the inaccuracy/false of the transmission with the form x is:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission/ the total number of probabilities = φ_x / ε

$\varpi_x = \varphi_x / \varepsilon = 3/4$

$\omega_x + \varpi_x = \delta_x / \varepsilon + \varphi_x / \varepsilon = 1/4 + 3/4 = 4/4 = 1$

The probability of the accuracy/truth of the transmission with the form y is:

ω_y = the total number of probabilities of the transmission in the form y to be the accurate transmission / the total number of probabilities = δ_y / ε

$\omega_y = \delta_y / \varepsilon = 1/4$

The probability of the inaccuracy/false of the transmission with the form y is:

ϖ_y = the total number of probabilities of the transmission in the form y to be an inaccurate transmission/ the total number of probabilities = φ_y / ε

$\varpi_y = \varphi_y / \varepsilon = 3/4$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1/4 + 3/4 = 4/4 = 1$

The probability of the accuracy/truth of the transmission with the form z is:

ω_z = the total number of probabilities of the transmission in the form z to be the accurate transmission / the total number of probabilities = δ_z / ε

$\omega_z = \delta_z / \varepsilon = 1/4$

The probability of the inaccuracy/false of the transmission with the form z is:

ϖ_z = the total number of probabilities of the transmission in the form z to be an inaccurate transmission/ the total number of probabilities = φ_z / ε

$\varpi_z = \varphi_z / \varepsilon = 3/4$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1/4 + 3/4 = 4/4 = 1$

[We may suppose] one and the same event is reported by *m* number of unknown people in the form *x*, by *r* number of unknown people in the form *y*, by *t* number of unknown people in the form *z*… and by *s* number of unknown people in the form *k*.

Concerning this event,

$x_1, x_2 \ldots x_m$ are the group of unknown people who relate the event in the form x.

$y_1, y_2 \ldots y_r$ are the group of unknown people who relate the event in the form y.

$z_1, z_2 \ldots z_t$ are the group of unknown people who relate the event in the form z.

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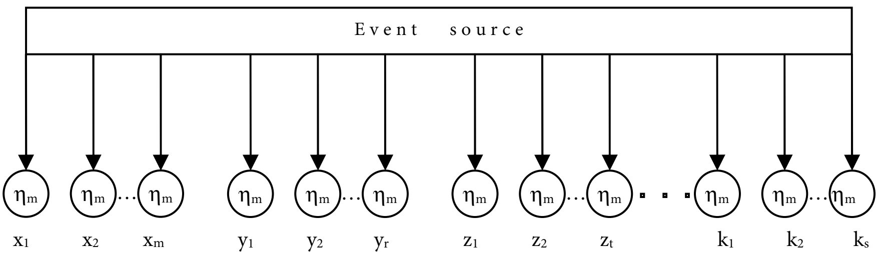
$k_1, k_2 \ldots k_s$ are the group of unknown people who related the event in the form k.



The total number of probabilities of the transmission in the form x to be the accurate transmission:

$\delta_x = 2^m - 1$

The total number of probabilities of the transmission in the form y to be the accurate transmission:

$\delta_y = 2^r - 1$

The total number of probabilities of the transmission in the form z to be the accurate transmission:

$\delta_z = 2^t - 1$

The total number of probabilities of the transmission in the form k to be the accurate transmission:

$\delta_k = 2^s - 1$

The total of the number of probabilities:

$\varepsilon = 2^m + 2^r + 2^t + \ldots + 2^s - (f-1)$

f: the number of diverging forms of transmission.

$f = (m/m + r/r + t/t + \ldots + s/s)$

The probability of the accuracy/truth of the transmission with the form x is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$\omega_x = \delta_x / \varepsilon = (2^m - 1) / [2^m + 2^r + 2^t + \ldots + 2^s - (f-1)]$

The probability of the inaccuracy/false of the transmission with the form x is:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission/ the total number of probabilities = φ_x / ε

$\varpi_x = \varphi_x / \varepsilon = 1 - (\delta_x / \varepsilon)$

$\omega_x + \varpi_x = \delta_x / \varepsilon + \varphi_x / \varepsilon = 1$

The probability of the accuracy/truth of the transmission with the form y is:

ω_y = the total number of probabilities of the transmission in the form y to be the accurate transmission / the total number of probabilities = δ_y / ε

$\omega_y = \delta_y / \varepsilon = (2^r - 1) / [2^m + 2^r + 2^t + \ldots + 2^s - (f-1)]$

The probability of the inaccuracy/false of the transmission with the form y is:

ϖ_y = the total number of probabilities of the transmission in the form y to be an inaccurate transmission/ the total number of probabilities = φ_y / ε

$\varpi_y = \varphi_y / \varepsilon = 1 - (\delta_y / \varepsilon)$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1$

The probability of the accuracy/truth of the transmission with the form z is:

ω_z = the total number of probabilities of the transmission in the form z to be the accurate transmission / the total number of probabilities = δ_z / ε

$\omega_z = \delta_z / \varepsilon = (2^t - 1) / [2^m + 2^r + 2^t + \ldots + 2^s - (f-1)]$

The probability of the inaccuracy/false of the transmission with the form z is:

ϖ_z = the total number of probabilities of the transmission in the form z to be an inaccurate transmission/ the total number of probabilities = φ_z / ε

$\varpi_z = \varphi_z / \varepsilon = 1 - (\delta_z / \varepsilon)$

$\omega_z + \varpi_z = \delta_z / \varepsilon + \varphi_z / \varepsilon = 1$

The probability of the accuracy/truth of the transmission with the form k is:

ω_k = the total number of probabilities of the transmission in the form k to be the accurate transmission / the total number of probabilities = δ_k / ε

$\omega_k = \delta_k / \varepsilon = (2^s - 1) / [2^m + 2^r + 2^t + \ldots + 2^s - (f-1)]$

The probability of the inaccuracy/false of the transmission with the form k is:

ϖ_k = the total number of probabilities of the transmission in the form k to be an inaccurate transmission/ the total number of probabilities = φ_k / ε

$\varpi_k = \varphi_k / \varepsilon = 1 - (\delta_k / \varepsilon)$

$\omega_k + \varpi_k = \delta_k / \varepsilon + \varphi_k / \varepsilon = 1$

REMOVING THE UNKNOWN CHARACTER OF AN UNKNOWN TRANSMITTER

I have already stated that when we receive a report on the authority of an unknown transmitter, we must consider its probability to be accurate as 50 % and to be inaccurate as % 50 again. The important question in this context is whether the reliability coefficient of the report of an unknown transmitter should change, when his report is supported by other reports and whether the reliability of this transmitter increases or not, because of the fact that his previous report is supported by other reports. Certainly, the level of the reliability of an unknown transmitter will be increased by every report of his when these reports are supported by other reports. However, since the situation of increase with regard to reliability is a process, not a complete fact, one cannot definitely calculate its mathematical value. For example, the reliability of an unknown transmitter increases as long as his reports are supported by other sources. However, if his last report is not supported in this manner, then his reliability level will decrease. Consequently, this person's reliability will be doubted until his death, when he can no longer transmit any new report.

Since the doubt in question concerns prophetic traditions, the transmitters in question are transmitters of prophetic traditions. Since these transmitters are people who lived in the past, it is not probable that they transmit any new report. Accordingly, within the theoretical framework developed in this study, it is possible that the unknown character of any transmitter can be removed by examining all reports issued by him.

i) Removing the Unknown Character of an Unknown Transmitter by Using Unknown Transmitters

Let us consider the first six cases examined above. Let the first transmitter who transmitted in the form x in these kinds of transmission be the person whose unknown character we want to remove. Let us suppose that all the transmissions he made throughout his life consist of these six transmissions.

1. Transmission: The transmitter is the only person to make this transmission. The probability that his transmission is true is $\omega_x=1/2$. To indicate the credit he gets trough the first transmission, let us use ${}_1\omega_x$. It is ${}_1\omega_x=1/2$.

2. Transmission: The transmitter is vindicated by one person. The probability that the transmission he makes is accurate is $\omega_x=3/4$. To indicate the credit he gets trough the second transmission, let us use ${}_2\omega_x$. It is ${}_2\omega_x=3/4$.

3. Transmission: The transmitter is challenged by one person in his third transmission. The probability that the transmission he makes is accurate is $\omega_x=1/3$. To indicate the credit he gets trough the third transmission, let us use ${}_3\omega_x$. It is ${}_3\omega_x=1/3$.

4. Transmission: the transmitter is vindicated by two people in his fourth transmission. The probability that the transmission he makes is accurate is $\omega_x=7/8$. To indicate the credit he gets trough the fourth transmission, let us use ${}_4\omega_x$. It is ${}_4\omega_x=7/8$.

5. Transmission: the transmitter is vindicated by one person in his fifth transmission and he is challenged by one person as well. The probability that the transmission he makes is accurate is $\omega_x=3/5$. To indicate the credit he gets trough the fifth transmission, let us use ${}_5\omega_x$. It is ${}_5\omega_x=3/5$.

6. Transmission: the transmitter is challenged by two different people in his sixth transmission. The probability that the transmission he makes is accurate is $\omega_x=1/4$. To indicate the credit he gets trough the sixth transmission, let us use ${}_6\omega_x$. It is ${}_6\omega_x=1/4$.

In this case, the reliability coefficient of the transmitter is calculated as following:

$\eta_{x1}=({}_1\omega_x+{}_2\omega_x+{}_3\omega_x+{}_4\omega_x+{}_5\omega_x+{}_6\omega_x)/6$

$\eta_{x1}=(1/2+3/4+1/3+7/8+3/5+1/4)/6$

$\eta_{x1}=(397/120)/6=397/720=0.5513\cong 0.55$

$\eta_{x1}=\%55$

The transmitter in question is no longer an unknown person, but he is a *known* transmitter who was % 55 accurate and % 45 inaccurate.

Removing the Unknown Character of an Unknown Transmitter who Transmitted N number of Reports

Let N be the total number of transmissions that the transmitter x_1 made throughout his life. The reliability coefficient of this transmitter can be calculated in the following way by using ω_x formula which we reached by using other unknown transmitters:

$\eta_{x1}=({}_1\omega_x+{}_2\omega_x+{}_3\omega_x+ \dots +{}_N\omega_x)/N$

ii) Removing the Unknown Character of an Unknown Transmitter by Using Known Transmitters

Let us suppose that the total number of transmissions which the transmitter —whose unknown character we want to remove— made throughout his life is N. When calculating the ω_x's of the transmissions of this transmitter, if the transmitters of the transmissions are known people, then the ω_x's of these transmissions are calculated by using the reliability coefficient of their transmitters.[6] The reliability coefficient of the transmitter, whose unknown character is desired to be removed, is assumed as $\eta_m=1/2$. The values we get are written in their proper places in the formula below, and thus the reliability coefficient of the transmitter, whose unknown character we want to remove, can be calculated.

$\eta_{x1}=({}_1\omega_x+{}_2\omega_x+{}_3\omega_x+ \dots +{}_N\omega_x)/N$

This coefficient which is obtained by using cases of known transmitters is less defective than the coefficient which is obtained by relying on cases of unknown transmitters.

[We may suppose] one and the same event is reported by *m* number of known people in the form *x*, by *r* number of known people in the form *y*, by *t* number of known people in the form *z*… and by *s* number of known people in the form *k*.

Concerning this event,

$x_1, x_2 \dots x_m$ are the group of known people who relate the event in the form x.

$y_1, y_2 \dots y_r$ are the group of known people who relate the event in the form y.

$z_1, z_2 \dots z_t$ are the group of known people who relate the event in the form z.

.
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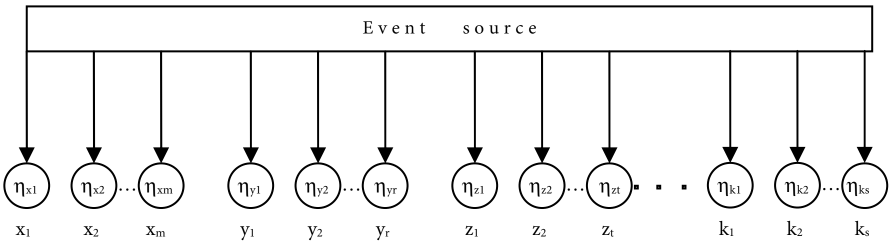
6 We shall explain in the following section, how to calculate it.

.

k_1, k_2 … k_s are the group of known people who related the event in the form k.



The total number of probabilities of the transmission in the form x to be the accurate transmission

$$\delta_x = \left[\frac{1/(1-\eta_{x1}) + 1/(1-\eta_{x2}) + \ldots + 1/(1-\eta_{xm})}{m} \right]^m - 1$$

The total of the number of probabilities:

$\varepsilon = (\delta_x+1)+ (\delta_y+1)+ (\delta_z+1)+ \ldots +(\delta_k+1) - (f-1)$

$\varepsilon = \delta_x+\delta_y+\delta_z+ \ldots +\delta_k + 1$

f: the number of diverging forms of transmission.

$f = (m/m + r/r + t/t + \ldots +s/s)$

The probability of the accuracy/truth of the transmission with the form x is:

ω_x = the total number of probabilities of the transmission in the form x to be the accurate transmission / the total number of probabilities = δ_x / ε

$$\omega_x = \frac{\delta_x}{\delta_x+\delta_y+\delta_z+ \ldots +\delta_k + 1}$$

The probability of the inaccuracy/false of the transmission with the form x is:

ϖ_x = the total number of probabilities of the transmission in the form x to be an inaccurate transmission/ the total number of probabilities = φ_x / ε

$\varpi_x = \varphi_x / \varepsilon = 1 - (\delta_x / \varepsilon)$

$\omega_x + \varpi_x = \delta_x / \varepsilon + \varphi_x / \varepsilon = 1$

The total number of probabilities of the transmission in the form y to be the accurate transmission

$$\delta_y = \left[\frac{1/(1-\eta_{y1}) + 1/(1-\eta_{y2}) + \ldots + 1/(1-\eta_{yr})}{r} \right]^r - 1$$

The total of the number of probabilities:

$\varepsilon = (\delta_x+1)+ (\delta_y+1)+ (\delta_z+1)+ \ldots +(\delta_k+1) - (f-1)$

$\varepsilon = \delta_x+\delta_y+\delta_z+ \ldots +\delta_k + 1$

f: the number of diverging forms of transmission.

$f = (m/m + r/r + t/t + \ldots +s/s)$

The probability of the accuracy/truth of the transmission with the form y is:

ω_y = the total number of probabilities of the transmission in the form y to be the accurate transmission / the total number of probabilities = δ_y / ε

$$\omega_y = \frac{\delta_y}{\delta_x+\delta_y+\delta_z+ \ldots +\delta_k + 1}$$

The probability of the inaccuracy/false of the transmission with the form y is:

ϖ_y = the total number of probabilities of the transmission in the form y to be an inaccurate transmission/ the total number of probabilities = φ_y / ε

$\varpi_y = \varphi_y / \varepsilon = 1 - (\delta_y / \varepsilon)$

$\omega_y + \varpi_y = \delta_y / \varepsilon + \varphi_y / \varepsilon = 1$

The total number of probabilities of the transmission in the form z to be the accurate transmission

$$\delta_z = \left[\frac{1/(1-\eta_{z1}) + 1/(1-\eta_{z2}) + ... + 1/(1-\eta_{zt})}{t}\right]^t - 1$$

The total of the number of probabilities:

$\varepsilon = (\delta_x+1)+ (\delta_y+1)+ (\delta_z+1)+ \dots +(\delta_k+1) - (f-1)$

$\varepsilon = \delta_x+\delta_y+\delta_z+ \dots +\delta_k + 1$

f: the number of diverging forms of transmission.

$f = (m/m + r/r + t/t + ... +s/s)$

The probability of the accuracy/truth of the transmission with the form z is:

ω_z = the total number of probabilities of the transmission in the form z to be the accurate transmission / the total number of probabilities = δ_z / ε

$$\omega_z = \frac{\delta_z}{\delta_x+\delta_y+\delta_z+ \dots +\delta_k + 1}$$

The probability of the inaccuracy/false of the transmission with the form z is:

ϖ_z = the total number of probabilities of the transmission in the form z to be an inaccurate transmission/ the total number of probabilities = φ_z / ε

$\varpi_z = \varphi_z / \varepsilon = 1 - (\delta_z / \varepsilon)$

$\omega_z + \varpi_z = \delta_z / \varepsilon + \varphi_z / \varepsilon = 1$

The total number of probabilities of the transmission in the form k to be the accurate transmission

$$\delta_k = \left[\frac{1/(1-\eta_{k1}) + 1/(1-\eta_{k2}) + ... + 1/(1-\eta_{ks})}{s}\right]^s - 1$$

The total of the number of probabilities:

$\varepsilon = (\delta_x+1)+ (\delta_y+1)+ (\delta_z+1)+ \dots +(\delta_k+1) - (f-1)$

$\varepsilon = \delta_x+\delta_y+\delta_z+ \dots +\delta_k + 1$

f: the number of diverging forms of transmission.

$f = (m/m + r/r + t/t + ... +s/s)$

The probability of the accuracy/truth of the transmission with the form k is:

ω_k = the total number of probabilities of the transmission in the form k to be the accurate transmission / the total number of probabilities = δ_k / ε

$$\omega_k = \frac{\delta_k}{\delta_x+\delta_y+\delta_z+ \ldots +\delta_k + 1}$$

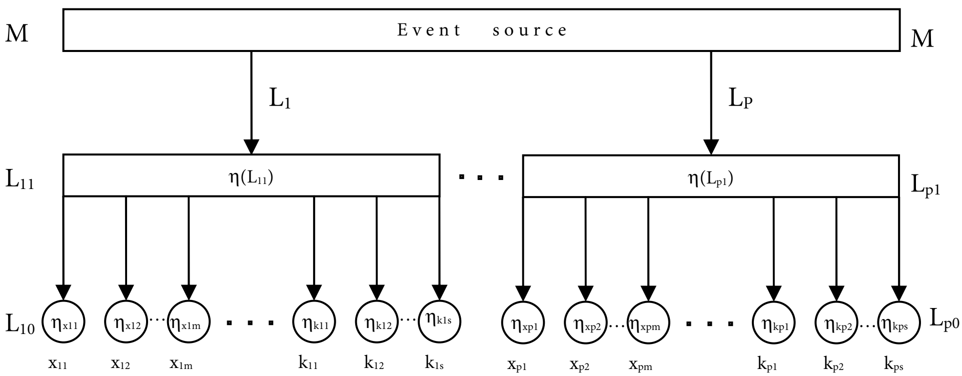
The probability of the inaccuracy/false of the transmission with the form k is:

ϖ_k = the total number of probabilities of the transmission in the form k to be an inaccurate transmission/ the total number of probabilities = φ_k / ε

$\varpi_k = \varphi_k / \varepsilon = 1 - (\delta_k / \varepsilon)$

$\omega_k + \varpi_k = \delta_k / \varepsilon + \varphi_k / \varepsilon = 1$

TRANSMISSIONS WITH MULTIPLE STAGES



The total number of probabilities of accurate transmissions of the report in the form x in L_{10} (1st column is at the 1st stage):

$$_{L10}(\delta_x) = \left(\frac{1/(1-\eta_{x11}) + 1/(1-\eta_{x12}) + \ldots + 1/(1-\eta_{x1m})}{m}\right)^m - 1$$

The total number of probabilities of accurate transmissions of the report in the form k in L_{10} (1st column is at the 1st stage):

$$_{L10}(\delta_k) = \left(\frac{1/(1-\eta_{k11}) + 1/(1-\eta_{k12}) + \ldots + 1/(1-\eta_{k1s})}{s}\right)^s - 1$$

The total number of probabilities in L_{10}:

$_{L10}(\varepsilon) = {}_{L10}(\delta_x) + \ldots + {}_{L10}(\delta_k) - (f-1) + f$

$_{L10}(\varepsilon) = {}_{L10}(\delta_x) + \ldots + {}_{L10}(\delta_k) + 1$

f: the number of diverging forms of transmission.

f = (m/m + ... + s/s)

When climbing from L_{10} to L_{11}, ω_x:

$$^{L10}(\omega_x)^{L11} = \frac{_{L10}(\delta_x)}{_{L10}(\varepsilon)}$$

When climbing from L_{10} to L_{11}, ω_k:

$$^{L10}(\omega_k)^{L11} = M\frac{_{L10}(\delta_k)}{_{L10}(\varepsilon)}$$

The total number of probabilities of accurate transmissions of the report in the form x in L_{p0} (p[th] column is at the 1[st] stage):

$$_{Lp0}(\delta_x) = \left(\frac{^{L_{p1}}1/(1-\eta_{xp1}) + 1/(1-\eta_{xp2}) + \ldots + 1/(1-\eta_{xpm})}{m}\right)^m - 1$$

The total number of probabilities of accurate transmissions of the report in the form k in L_{p0} (p[th] column is at the 1[st] stage):

$$_{Lp0}(\delta_k) = \left(\frac{1/(1-\eta_{kp1}) + 1/(1-\eta_{kp2}) + \ldots + 1/(1-\eta_{kps})}{s}\right)^s - 1$$

The total number of probabilities in L_{p0} :

$_{Lp0}(\varepsilon) = {}_{Lp0}(\delta_x) + \ldots + {}_{Lp0}(\delta_k) - (f-1) + f$

$_{Lp0}(\varepsilon) = {}_{Lp0}(\delta_x) + \ldots + {}_{Lp0}(\delta_k) + 1$

f: the number of diverging forms of transmission.

f = (m/m + ... + s/s)

When climbing from L_{p0} to L_{p1}, ω_x:

$$ {}^{Lp0}(\omega_x)^{Lp1} = \frac{{}_{Lp0}(\delta_x)}{{}_{Lp0}(\varepsilon)} $$

When climbing from L_{p0} to L_{p1}, ω_k:

$$ {}^{Lp0}(\omega_k)^{Lp1} = \frac{{}_{Lp0}(\delta_k)}{{}_{Lp0}(\varepsilon)} $$

The total number of probabilities of accurate transmissions of the report in the form x in L_{*1} (all columns are at the 1st stage):

$$ {}_{L*1}(\delta_x) = \left(\frac{1/(1-{}^{L10}(\omega_x)^{L11}.\eta_{L11}) + 1/(1-{}^{L20}(\omega_x)^{L21}.\eta_{L21}) + \ldots + 1/(1-{}^{Lp0}(\omega_x)^{Lp1}.\eta_{Lp1})}{p}\right)^{p} - 1 $$

The total number of probabilities of accurate transmissions of the report in the form k in L_{*1} (all columns are at the 1st stage):

$$ {}_{L*1}(\delta_k) = \left(\frac{1/(1-{}^{L10}(\omega_k)^{L11}.\eta_{L11}) + 1/(1-{}^{L20}(\omega_k)^{L21}.\eta_{L21}) + \ldots + 1/(1-{}^{Lp0}(\omega_k)^{Lp1}.\eta_{Lp1})}{p}\right)^{p} - 1 $$

The total number of probabilities in L_{*1} :

$$ {}_{L*1}(\varepsilon) = ({}_{L*1}(\delta_x)+1) + \ldots + ({}_{L*1}(\delta_k)+1) - (f-1) $$

$$ {}_{L*1}(\varepsilon) = {}_{L*1}(\delta_x) + \ldots + {}_{L*1}(\delta_k)+1 $$

f: the number of diverging forms of transmission.

f = (m/m + ... + s/s)

When climbing from L_{*1} to M, ω_x:

$$^{L*1}(\omega_x)^M = \frac{_{L*1}(\delta_x)}{_{L*1}(\varepsilon)}$$

Consequently:

The probability of accurate transmissions of the report in the form x is $^{L*1}(\omega_x)^M$.

The probability of inaccurate transmissions of the report in the form x is: $^{L*1}(\varpi_k)^M$.

$^{L*1}(\varpi_x)^M = 1 - {}^{L*1}(\omega_x)^M$

When climbing from L_{*1} to M, ω_k:

$$^{L*1}(\omega_k)^M = \frac{_{L*1}(\delta_k)}{_{L*1}(\varepsilon)}$$

Consequently:

The probability of accurate transmissions of the report in the form k is $^{L*1}(\omega_k)^M$.

The probability of inaccurate transmissions of the report in the form k is: $^{L*1}(\varpi_k)^M$.

$^{L*1}(\varpi_k)^M = 1 - {}^{L*1}(\omega_k)^M$

PROBABILITY VALUES OF DIFFERENCES AMONG TRANSMISSIONS

Up to this part of our study, we took transmissions as units on their own. We considered probabilities of 'the report in the form x,' 'the report in the form y,' etc. we assumed that the transmission in the form x is a different transmission from the transmission in the form y. However, we have not claimed that these two versions of transmission are *totally* different, since it is possible that different transmissions may have similar as well as dissimilar aspects with regard to meaning and wording. Certainly, the probability values of the similar and dissimilar aspects of these forms are different.

After calculating the probability value of a transmission as a whole, then various forms of the same transmission should be examined with regard to their parts. Charts indicating probability values of similar and dissimilar aspects of various versions with regard to meaning and wording should be drawn. Thus we will identify the probability value of each and every form of a prophetic tradition. It will be possible to build up its *most probable form*.

Suppose, the text part of the form x (of a prophetic tradition) contains five words:

k_{1x} k_{2x} k_{3x} k_{4x} k_{5x}

The probability of accuracy of the form x ω_x is the probability of the accuracy of each word in this form.

Suppose, the text part of the form y contains 6 words:

k_{1y} k_{2y} k_{3y} k_{4y} k_{5y} k_{6y}

The probability of accuracy of the form y ω_y is the probability of the accuracy of each word in this form.

$k_{1x} = k_{1y}$

$k_{2x} = k_{2y}$

$k_{3x} = k_{3y}$

$k_{4x} \neq k_{4y}$

$k_{5x} = k_{5y}$

Suppose, the word 'k_{6y}' occurs only in the form y. And suppose except for the 4^{th} word, two forms of a transmission, x and y, have the same words.

Then the probabilities of truth of the words found in both versions are:

$(\omega)k_{1x}=\omega_x$

$(\omega)k_{1y}=\omega_y$

The total number of probabilities of the word k_{1x} to be the accurate transmission is:

$\delta_{k1x} = \delta_{k1y}$

$$\delta_{k1x} = \left(\frac{1/(1-\omega_x) + 1/(1-\omega_y)}{2}\right)^2 - 1$$

The total number of probabilities of k_{1x}:

$\varepsilon_{k1x} = \varepsilon_{k1y}$

$$\varepsilon_{k1x} = \left(\frac{1/(1-\omega_x) + 1/(1-\omega_y)}{2}\right)^2$$

Since these two words are the same, the composite probability is:

$B(\omega)k_{1x} = B(\omega)k_{1y}$

$$B(\omega)k_{1x} = \frac{\delta_{k1x}}{\varepsilon_{k1x}}$$

The same composite probability is applicable to 2nd, 3rd and 5th words.

$B(\omega)k_{1x} = B(\omega)k_{1y} = B(\omega)k_{2x} = B(\omega)k_{2y} = B(\omega)k_{3x} = B(\omega)k_{3y} = B(\omega)k_{5x} = B(\omega)k_{5y}$

The words in the 4th place are different.

$k_{4x} \neq k_{4y}$

$(\omega)k_{4x}=\omega_x$

$(\omega)k_{4y}=\omega_y$

The total number of probabilities of the word k_{4x} to be the accurate transmission is:

$$\delta_{k4x} =\left(\frac{1/(1-\omega_x)}{1}\right)^1 - 1$$

The total number of probabilities of the word k_{4x}:

$$\varepsilon_{k4x} = \left(\frac{1/(1-\omega_x)}{1}\right)^1 + \left(\frac{1/(1-\omega_y)}{1}\right)^1 - (f-1)$$

f: the number of diverging words.

k_{4x} ve $k_{4y} \Rightarrow f = 2$

The total composite probability of the word k_{4x} :

$$B(\omega)k_{4x} = \frac{\delta_{k4x}}{\varepsilon_{k4x}}$$

The total number of probabilities of the word k_{4y} to be the accurate transmission is:

$$\delta_{k4y} = \left(\frac{1/(1-\omega_y)}{1}\right)^1 - 1$$

The total number of probabilities of the word k_{4y}:

$$\varepsilon_{k4y} = \left(\frac{1/(1-\omega_x)}{1}\right)^1 + \left(\frac{1/(1-\omega_y)}{1}\right)^1 - (f-1)$$

f: the number of diverging words.

k_{4x} ve k_{4y} $\Rightarrow f = 2$

The total composite probability of the word k_{4y} :

$$B(\omega)k_{4y} = \frac{\delta_{k4y}}{\varepsilon_{k4y}}$$

Suppose there is a 6th word in the form y, but the form x does not contain a 6th word.

K_{6x} = a missing word= an empty word.

$k_{6x} \neq k_{6y}$

$(\omega)k_{6x}=\omega_x$

$(\omega)k_{6y}=\omega_y$

The total number of probabilities of the empty word k_{6x} to be the accurate transmission is:

$$\delta_{k6x} = \left(\frac{1/(1-\omega_x)}{1}\right)^1 - 1$$

The total number of probabilities of the word k_{6x}:

$$\varepsilon_{k6x} = \left(\frac{1/(1-\omega_x)}{1}\right)^1 + \left(\frac{1/(1-\omega_y)}{1}\right)^1 - (f-1)$$

f: the number of diverging words.

k_{6x} ve k_{6y} $\Rightarrow f = 2$

The total composite probability of the word k_{6x} :

$$B(\omega)k_{6x} = \frac{\delta_{k6x}}{\varepsilon_{k6x}}$$

The total number of probabilities of the word k_{6y} to be the accurate transmission is:

$$\delta_{k6y} = \left(\frac{1/(1-\omega_y)}{1}\right)^1 - 1$$

The total number of probabilities of the word k_{6y}:

$$\varepsilon_{k6y} = \left(\frac{1/(1-\omega_x)}{1}\right)^1 + \left(\frac{1/(1-\omega_y)}{1}\right)^1 - (f-1)$$

f: the number of diverging words.

k_{6x} ve k_{6y} $\Rightarrow f = 2$

The total composite probability of the word k_{6y} :

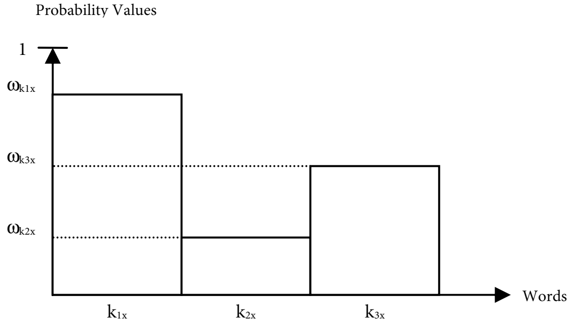
$$B(\omega)k_{6y} = \frac{\delta_{k6y}}{\varepsilon_{k6y}}$$

One should not prefer this method in order to minimize making errors concerning the probability values of words. When examining various chains of transmissions of a prophetic tradition, instead of assigning transmission forms to them by a holistic approach, one should have a piecemeal approach and identify forms of word with respect to meaning and shape (shekil). Calculations should be carried out on these word forms at every stage, and the probability values of similar and dissimilar words should be calculated separately. Then based on the obtained results, one may draw charts indicating the probability values of words.

Let ω_{k1x} be the probability that the word k_{1x} is true,

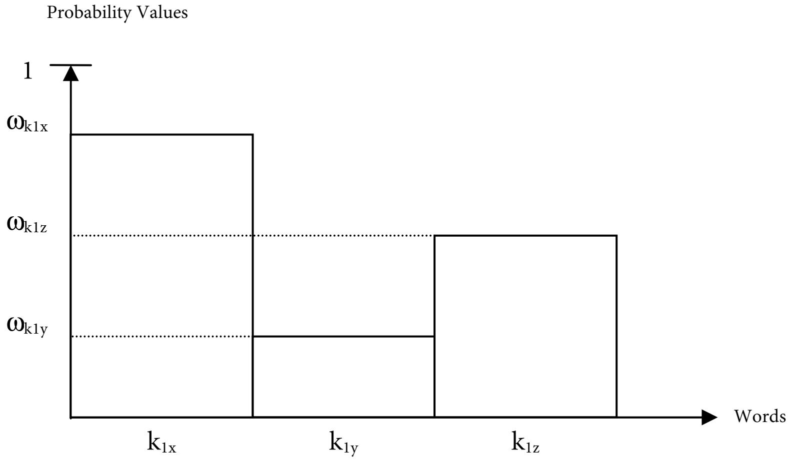
Let ω_{k2x} be the probability that the word k_{2x} is true,

Let ω_{k3x} be the probability that the word k_{3x} is true, If $\omega_{k1x} > \omega_{k3x} > \omega_{k2x}$,



The chart that shows the probability values of words with the same form but at different positions.

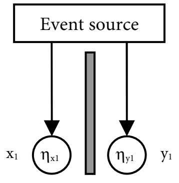
Let ω_{k1x} be the probability that the word k_{1x} is true,
Let ω_{k1y} be the probability that the word k_{1y} is true,
Let ω_{k1z} be the probability that the word k_{1z} is true,
If $\omega_{k1x} > \omega_{k1z} > \omega_{k1y}$,



The chart that shows the probability values of words with different forms in the same position. As it is shown, k_{1x} is the most probable word.

TRANSMISSIONS WITH ISOLATED TRANSMITTERS

If one identifies that there is isolation between any two transmitters transmitting the same prophetic tradition, at this point the transmissions of these two transmitters are suitable to make word by word probability calculations.



Let the text of the form x contain five words:

k_{1x} k_{2x} k_{3x} k_{4x} k_{5x}

Let the text of the form y contain six words:

k_{1y} k_{2y} k_{3y} k_{4y} k_{5y} k_{6y}

$k_{1x} = k_{1y}$

$k_{2x} = k_{2y}$

$k_{3x} = k_{3y}$

$k_{4x} \neq k_{4y}$

Let it also be assumed that $k_{5x} = k_{5y}$.

($k_{4x} \neq k_{4y}$ can be with respect to meaning as well as with respect to shape (shekil). One may simply disregard the differences in shape.)

Let k_{6y} exist only in the form y. (Accordingly, k_{6x} will be considered as 'empty word.' In probability calculations, we shall take into account the probability that people may not pronounce a word, i.e., may utter an empty word.)

ε = total number of words in Arabic+1 (empty word).

The probability that $k_{1x} = k_{1y}$ is $1/\varepsilon$; the probability that $k_{1x} \neq k_{1y}$ is $(\varepsilon-1)/\varepsilon$.

The probability that $k_{2x} = k_{2y}$ is $1/\varepsilon$; the probability that $k_{2x} \neq k_{2y}$ is $(\varepsilon-1)/\varepsilon$.

The probability that $k_{3x} = k_{3y}$ is $1/\varepsilon$; the probability that $k_{3x} \neq k_{3y}$ is $(\varepsilon-1)/\varepsilon$.

The probability that $k_{4x} = k_{4y}$ is $1/\varepsilon$; the probability that $k_{4x} \neq k_{4y}$ is $(\varepsilon-1)/\varepsilon$.

The probability that $k_{5x} = k_{5y}$ is $1/\varepsilon$; the probability that $k_{5x} \neq k_{5y}$ is $(\varepsilon-1)/\varepsilon$.

The probability that $k_{6x} = k_{6y}$ is $1/\varepsilon$; the probability that $k_{6x} \neq k_{6y}$ is $(\varepsilon-1)/\varepsilon$.

Paying attention to arrangements in the forms x and y, the probability that the transmitters of x and y forge a transmission like the one above:

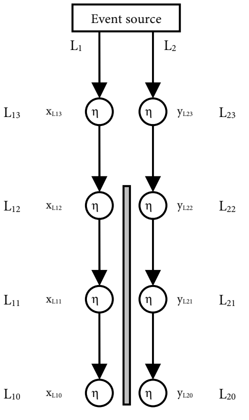
$k_{1y}=k_{1x}\quad k_{2y}=k_{2x}\quad k_{3y}=k_{3x}\quad k_{4y}\neq k_{4x}\quad k_{5y}=k_{5x}\quad k_{6y}\neq k_{6x}$

$\varpi_{x,y}=\ 1/\varepsilon\ \ .\ \ 1/\varepsilon\ \ .\ \ 1/\varepsilon\ \ .\ (\varepsilon-1)/\varepsilon\ .\ \ 1/\varepsilon\ \ .\ (\varepsilon-1)/\varepsilon$

Consequently, the probability that such transmission is accurate:

$\omega_{x,y} = 1 - \varpi_{x,y}$

This value of probability is applicable insofar as there is isolation, and it is not applicable when there is no isolation. For example, suppose that the transmitters x_{L13} and y_{L23} have witnessed a prophetic tradition, and then they settled in different regions. Suppose there is isolation between transmitters coming after them.



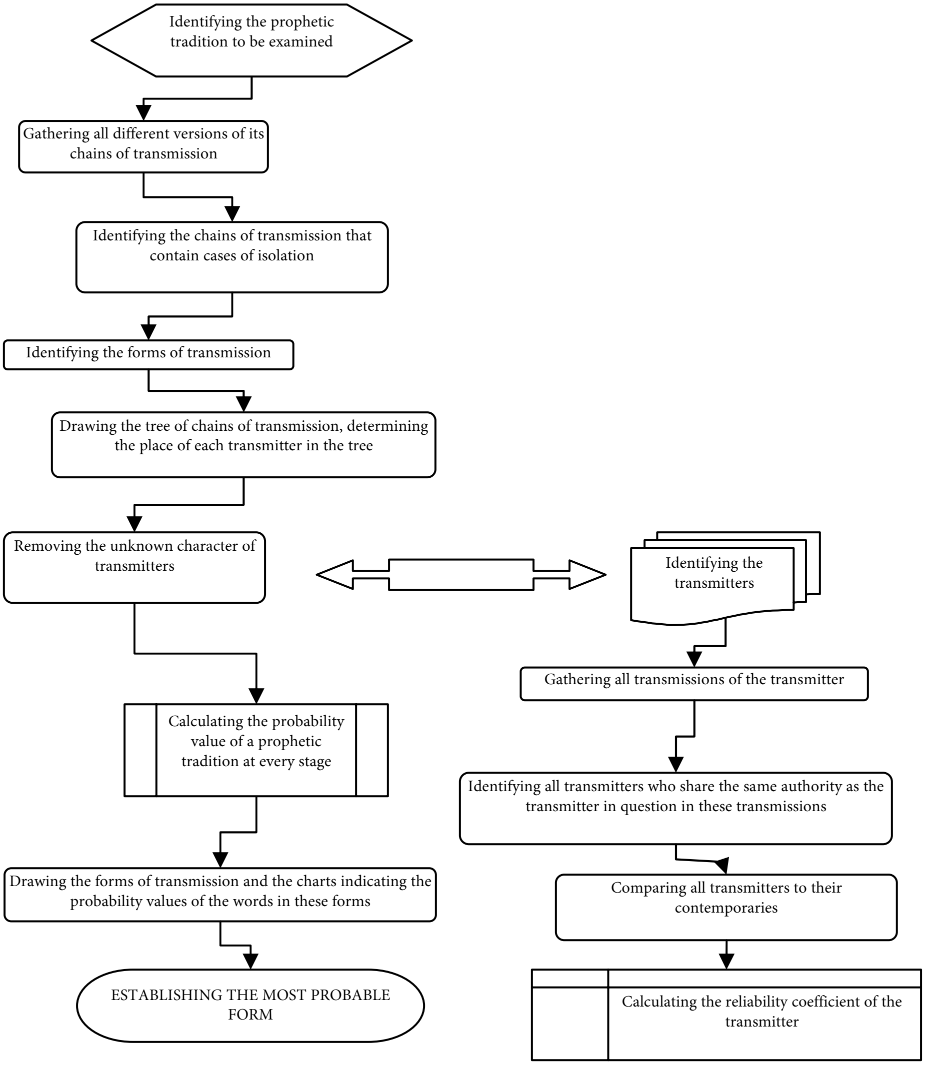
On this supposition, isolation begins from transmitter x_{L12} and y_{L22} onward. Accordingly, the $\omega_{x,y}$ that will be calculated on the x and y forms is applicable at the point where isolation ends.

$\omega_{x,y} = {}^{L*0}(\omega_x)^{L*3}$

$\omega_{x,y} = {}^{L*0}(\omega_y)^{L*3}$

Isolation may be between two parallel chains of transmission, as illustrated here, or it may involve more chains of transmission. Calculations vary accordingly.

THE PROPOSED DIAGRAM OF FLOW IN APPLYING THE MODEL



CONCLUSION

When I studied works on prophetic traditions, I used to think that the probability of so many people's forging false reports in an organized manner was very low. And I used to try to reach a numerical calculation of its proportion. My studies that began with an amateur spirit led me to think that probability calculations, a sub-branch of mathematics, could be used to do this. Thus I came out with this theoretical framework, which I will work out its application on transmitters in my future studies.

The prophetic traditions that are the subject-matter of transmission are transmitted after they are heard of the Prophet by transmitters—who passed away—through chains of transmissions that contain their names to following generations. Scholars of the prophetic traditions state that these transmissions 'do not yield certainty but 'high probability.'[7] I think, they used the description 'high probability' to indicate that the probability of the words to belong to the Prophet is very high.

The probability, in this context, has a mathematical value. The study at hand is an attempt to discover this value. If this theory is applied to prophetic traditions, *the probability value of each of them at all levels of transmission* will be discovered. Thus in our study, we do not make any claim whether prophetic traditions were transmitted in a reliable or an unreliable manner. But I do claim that if this theory is applied to a prophetic tradition, the numerical value of the reliability of its transmission will result, and the unknown character of its transmitter(s) will be removed. Certainly, applying this theory to extended groups of transmitters can be achieved via collaborative works.

I have explained through an example how extensive a study is needed to calculate the probability value of a prophetic tradition: I have gathered all different versions of chains of its transmission. I identified 16 versions of chains of transmission and 8 stages ($L_{16,8}$). There were more than 30 transmitter included in these versions of chains of transmissions. Calculating the reliability coefficient of each transmitter is the most important stage in the model. Calculating the coefficient of a transmitter means gathering all the transmissions of this transmitter. Among the transmitters of prophetic traditions some people have 200 transmissions while some others have more than 5000 transmissions. Furthermore, one should not stop when he identifies all transmissions of a transmitters. One should also search for transmissions coming from people other than the master of the transmitter in question and apply it according to the theory. This requires that the numbers given above must be multiplied by 5 to 50 times, that is, 200*5 or 200*50, or 5000*5 or

[7] See Muhammad Jamāluddīn al-Qāsimī, *Qawā'idu't-Tahdīth* (Beirut: 1399), p. 151. As for literature concerning the view that prophetic traditions have 'high probability,' see Ibrahim Hatiboglu, "Klasik Hadis Usûlü ve Çagdas Metodolojilerin Degeri Üzerine," *Islâmî Ilimlerde Metodoloji Problemi: Hadis Ilminde Metodoloji Problemi Ihtisas Toplantisi* 24–25 January, 2004, ISAV, Istanbul, pp.14–28.

5000*50. Thus, in order to calculate the reliability coefficient of a single transmitter, one must study approximately at least 1000 and at most 25000 transmissions. Hence such a study should be done concerning 30 people, in order to calculate the probability value of the transmission, which I chose as an example case to examine versions of transmission chains.

However, once the reliability coefficient of a transmitter is calculated, it is possible to use the result when examining another prophetic tradition which is transmitted by this transmitter. As a result, the more the reliability coefficients of transmitters are calculated, the less difficult it becomes to calculate the probability value of a prophetic tradition.

When probability values are calculated, it will become clear how much useful information, which is intended to distinguish between that which is accurate and inaccurate, is included in the system of ascription (*isnād*). I believe, this system is an utterly coherent system of transmission, which makes it possible to trace all kinds of inaccurate transmissions.

I think, this study, which is done with the hope that we make best use of the great net of ascriptions, of which past Muslim scholars—perhaps unknowingly—were parts, and with the hope to devise a means to distinguish sound prophetic traditions from faulty ones, provides an occasion to have better understanding of the system of ascription and to benefit more from it. At least, the model proposed in the article is the result of such an intention.

“A Theoretical Approach to the System of Transmission of *Hadīth* Based on Probability Calculations”

Abstract: In Hadīth terminology, we come across terms such as thiqa (trustworthy), mutqin (convincing), ʻadl (just), sadūq (veracious), matrūk (abandoned), daʻīf (weak) and so on. Each of these terms is used to denote the level of the reliability of a transmitter (rāvī) of Prophetic Traditions. And there is another group of terms such as sahīh (sound), hasan (good) and daʻīf (weak). When any of these terms are predicated of a Prophetic Tradition, they indicate the proportion of probability of whether a supposed prophetic tradition actually belongs to the Prophet. Examining prophetic traditions, scholars studying prophetic traditions took into account the consistency of transmitters in general terms and all different chains of transmission of a prophetic tradition. They evaluated prophetic traditions according to what these two criteria makes more probable. In this article, I propose a model to determine numerical values of classes of transmitters and of properties (hukm) of prophetic traditions. It will also to help us identify the most probable form of any prophetic tradition.

Citation: Halis AYDEMİR, “A Theoretical Approach to the System of Transmission of *Hadīth* Based on Probability Calculations”, *Hadis Tetkikleri Dergisi* (*HTD*), III/1, 2005, pp. 39-72.

Key words: Riwaya, isnad, hadīth, probability calculations, mathmetical analysis.