

# The Effectiveness of Yoga on Spiritual Intelligence in Air Traffic Controllers of Tehran Flight Control Center

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## Abstract

The aim of this study was to evaluate the efficacy of yoga on spiritual intelligence in air traffic controllers in Tehran flight control center. This was a quasi-experimental research and the study population includes all air traffic controllers in Tehran flight control center. The sample consisted of 40 people of the study population that were selected through convenience sampling method and were randomly divided into experimental group (20) and control group (n=20). This research was conducted through training yoga on the air traffic controllers to experimental group compared with the control group. The data were evaluated as the changes resulted after the intervention (post-test) compared to the previous condition (pre-test). King's (2008) Spiritual Intelligence Self-Report Inventory (SISRI) was used to measure the variables. The data were analyzed by analysis of covariance. The results showed that yoga exercises had a significant effect on spiritual intelligence and its components (critical thinking, personal meaning production, expanded state of consciousness, transcendental consciousness) in the subjects.

**Keywords:** yoga, spiritual intelligence, air traffic controllers

## 1. Introduction

### 1.1 Introducing the Problem

Yoga is one of the six basic Indian philosophies, which has been studied, described and analyzed in the field of the human mind complexities for thousands of years (Feuerstein, 1998). Yoga means unity, solidarity and unanimity (Vallyzadeh, 1999). Yoga is an exercise that affects on physical function, physical and emotional role, social function, energy (reduced fatigue), mental health and public health (Pour Dehkordi & Nik Farjam, 2015). Hence yoga is considered as an effective and valuable tool to overcome the human multiple physical and psychological problems (Jadhav & Havalappanvar, 2009). Yoga exercises can reduce the stress and anxiety in people (Barnes, Bloom, & Nahin, 2008).

### 1.2 Importance of the Problem

One of the very important issues in the field of personal and professional progress is intelligence which has different aspects and classifications. One of the concepts that has been raised and developed in the light of psychologists' global interest in religion and spirituality is spiritual intelligence. Spiritual intelligence combines spiritual and intelligence structures within a new structure (Emmons, 2006). Spiritual intelligence makes use of multiple ways to recognize and understand issues and tries to link the life of soul and mind to human external and working life (Vaughan, 2003). In fact, spiritual intelligence causes the optimal use of conceptual intelligence and intelligence and this important issue is very important in people's everyday interactions, especially in professional environments (Animasahun, 2010). Unlike IQ, spiritual intelligence can be improved and increased and it does not limit to any gender, race and age (Sohrabi, 2008).

### 1.3 Relevant Literature

On the effect of yoga on spiritual intelligence, we can say that yoga increases critical existential thought so that it provides the grounds for further understanding of the feelings and dominating on them by creating a meditation in itself (Swami & Kumar, 2007); as well as yoga exercises as an individual self-assistance system is effective

for mental-spiritual progress, so that Yoga instructions which include ethical and spiritual standards of life can assist to spiritual improvement and knowledge development by physical exercises and breathing (Adhia, Nagendra, & Mahadevan, 2010). Transcendental consciousness is one other aspect of spiritual intelligence (King, 2007) and yoga can affect on it. By establishment of more and deeper meditations in individuals, Yoga provides the ground of transcendental consciousness in them (Mousavinasab, 2008). Yoga exercises affect on reinforcing some features such as strengthening accuracy and concentration as explanatory factors of the expansion of consciousness (Khalsa, 2004). According to researchers, yoga and spiritual intelligence have theoretical and conceptual affinity with each other, and yoga causes internal thought which increases the spiritual intelligence in individuals. In confirming this important issue, it is said that those who exercise yoga can only experience yoga when they work in union with God. And generally, in-depth esoteric knowledge is realized in yoga process (Moeinifar & Janfeda, 2012). Also yoga makes a person close to his/her spiritual aspect (Ghaseminejad, 2010). In this regard, Moadel et al. (2007) state that Yoga as an individual self-assistance system is effective for spiritual and psychological development (Moadel et al., 2007). Also it is believed that yoga exercises are effective on self-awareness which is also known as one of the components of spiritual intelligence (Tibi, Babahaji, & Sadeghi Shermeh, 2011).

In other researches on the effects of yoga, some factors have been referred such as the strengthening of attention and focus (equivalent to expansion of consciousness in spiritual intelligence) and the strengthening of faith (belief in the Creator with stimulating the power of thought and peace which is equivalent to the production of personal meaning in spiritual intelligence) that indirectly refers to the common aspects of yoga and enjoyment of spiritual intelligence and indicates that the use of yoga can effectively increase the people's level of spiritual intelligence (Khalsa, 2004). In another study, the positive impact of a course of yoga on life quality and reducing stress in patients has been reported (Banasik & Haberman, 2008). Also it was shown that yoga exercise for three months had a significant effect on reducing the levels of stress in cancer patients (Davoudabadi, 2010).

One of the difficult jobs in the world is the flight care profession which is done by the air controllers. Air traffic controllers are responsible for separation between airplanes, and airplanes and obstacles. Of their other duties is to regulate and accelerate air traffic. Air traffic controllers are working in three sectors of aerodrome control tower, approach control unit and the flight control center. The aerodrome control tower is responsible for presenting services for air traffic control in the area near to airport and up to certain height that this area is various based on the number of flights and possibilities of each airport. Another sector is approach control unit which is briefly called approach.

The controllers who are working in this unit are called to the approach controllers and responsible for providing service to flights entering to or exiting from one airport or airports near to each other and finally the area control center gives aerial traffic control service to flights on air routes between airports or international flights passing from the country's aerial space and are responsible to coordinate all aerodrome control towers in the country and the neighboring countries.

On the one hand, controllers work in a complex and dynamic environment that requires continuous processing of permanent and sensitive information flows produced from a multiple communication, navigation and surveillance network (Dekker & Suparamaniam, 2006). This profession is stressful and requires high concentration and intelligence in order to prevent harmful events with high costs; this important fact explains more attention to factors that make possible this issue. In other words, this subject must be studied that considering what issues in this group of people can reduce their stress and also reduce human error. So perhaps enjoying spiritual intelligence can be effective in this matter. According to the 100 percent increase in the number of flights across the country and the annual increase rate of air traffic in the region and in the world in the past year and limitation of the number of controllers, in addition to normal stress resulting from the nature of the work of this group of employees, the rate of mental burden imposed them has currently increased significantly and this important issue explains the necessity of conducting further studies in this field especially in the present time (Izadi Lai Bidi et al., 2016).

#### *1.4 Research Hypotheses*

The hypothesis posed by the researcher is that yoga exercise is effective in spiritual intelligence in air traffic controllers at Tehran flight control center.

## 2. Research Method

According to the objective (the effectiveness of yoga on spiritual intelligence in air traffic controllers), the present study is quasi-experimental. In the survey part, the distribution of questionnaires and measurement of the changes in variables were used and in analysis of data, the changes after intervention (post-test) were compared to the conditions before intervention (pre-test). In the present study, analysis of covariance was used to evaluate the results of the intervention. This research was conducted through training yoga exercises to the air traffic controllers with the control group (a group that did not receive any intervention).

The statistical population of this research consisted of all air traffic controllers at Tehran flight control center in 2016 that all of them were men. The sample size consisted of 40 controllers working in Tehran flight control center that were assigned to the two experimental and control groups (20 people per each group). All participants joined the study voluntarily. Convenience sampling method was used for sampling and the participants were randomly assigned into experimental and control groups. The criteria to enter the study included being volunteer the participant, the age of 25-40 years, lack of experience in practicing yoga or meditation as well as criteria for not entering the study included physical or physical-mental illness.

## 3. Data Collection

### 3.1 *The Spiritual Intelligence Self-Report Inventory (SISRI) (King, 2008)*

The Spiritual Intelligence Self-Report Inventory (SISRI) was designed by King (2008). The scale consisted of 24 items and four subscales including critical existential thinking (items 1, 3, 5, 9, 13, 17 & 20), production of personal meaning (items 7, 11, 15, 19 & 22), transcendental consciousness (items 2, 6, 10, 14 & 18) and expanded state of consciousness (4, 8, 12, 16 & 23). The higher the individual's score in this scale, the more his spiritual intelligence will be. Scoring was done based on five-point Likert scale range from "completely right" to "completely wrong" (Raghib et al., 2010). The reliability of this scale was estimated equal to 0.88 using Cronbach's alpha coefficient. The face validity and content validity the scale were confirmed by specialists in psychology.

### 3.2 *Procedure*

In order to implement the research, the participants were trained the yoga exercises by yoga specialist weekly in the sport-training complex of yoga in Tehran. Participants received yoga exercises for eight continuous weeks, 2 sessions per week and 2 hours and 30 minutes per each session; after that based on the individual's ability and the way of receiving training, the next sessions were held with more intervals. The subject should at least practice the trained exercises for one hour in a day (preferably half an hour in the morning and half an hour in the evening).

## 4. Findings

### 4.1 *Gender*

As described on the statistical population, all of the participants were men.

### 4.2 *Age*

In the study, there were 14 individuals aged 31 to 40 years and 6 individuals aged 25 to 30 years in experimental group; and 8 individuals aged 25 to 30 years, 7 individuals aged 31 to 35 years, and 5 individuals aged 36 to 40 years in the control group.

### 4.3 *Data Analysis*

#### 4.3.1 *Descriptive Statistics of the Variable*

##### 4.3.1.1 *Spiritual Intelligence in Experimental Groups*

The results of the mean and standard deviation of data as well as the median and the maximum of data in pre-test and post-test have been presented in Table 1 for both the experimental and control groups separately.

Table 1. Descriptive analysis of the components of spiritual intelligence (pre-test, post-test\_\_subjects)

Spiritual intelligence	Spiritual intelligence in pre-test				Spiritual intelligence in post-test			
	M	SD	Min	Max	M	SD	Min	Max
<b>Critical existential thinking</b>	3.210	1.1021	1.9	4.9	2.750	0.6074	1.6	3.6
<b>Production of personal meaning</b>	3.270	0.6191	2.7	4.7	2.850	0.4936	1.8	4.5
<b>Transcendental consciousness</b>	3.390	1.3490	1.3	5.0	2.545	1.2593	1.3	4.7
<b>Expanded state of consciousness</b>	3.480	1.1247	1.2	5.0	2.500	1.2740	1.2	4.6

The results of descriptive analysis of spiritual intelligence indicate that the mean rates of variables in all components of spiritual intelligence have been increased in post-test; in other words, we can say that the yoga exercises have had a positive effect in this field.

#### 4.3.1.2 Spiritual Intelligence in Control Group

The results of the descriptive analysis of the components of spiritual intelligence in pre-test and post-test have been presented in Table 2.

Table 2. Descriptive analysis of the components of spiritual intelligence (pre-test, post-test, in control group)

Spiritual intelligence	Spiritual intelligence in pre-test				Spiritual intelligence in post-test			
	M	SD	Min	Max	M	SD	Min	Max
<b>Critical existential thinking</b>	2.832	0.2732	2.4	3.4	2.910	0.1889	2.6	3.3
<b>Production of personal meaning</b>	2.791	0.3558	2.2	3.5	2.910	0.3999	2.0	3.7
<b>Transcendental consciousness</b>	2.500	0.2507	2.0	3.0	2.435	0.4826	1.4	3.3
<b>Expanded state of consciousness</b>	2.514	0.5710	1.6	3.6	2.620	0.6771	1.6	4.4

The results of descriptive analysis indicate that the mean rates of data in all components of spiritual intelligence have not been changed significantly in pre-test and post-test in the control group.

#### 4.3.2 Inferential Statistics of the Data

To perform the variance analysis test, the test hypotheses were studied. In the research method, we referred to the random selection of the sample; to study the consistency of variances, Levin test was used. Also, to verify the normal distribution of data, Kolmogorov-Smirnov test was used that the results are presented in the following tables:

##### 4.3.2.1 Normality Test (Experimental Group)

Table 3. Results of Kolmogorov-Smirnov test for spiritual intelligence in the experimental group

Spiritual intelligence	Spiritual intelligence in post-test		Spiritual intelligence in pre-test	
	SK-test	Sig.	SK-test	Sig.
<b>Critical existential thinking</b>	0.849	0.467	0.974	0.299
<b>Production of personal meaning</b>	0.872	0.432	1.298	0.069
<b>Transcendental consciousness</b>	0.780	0.577	0.972	0.301
<b>Expanded state of consciousness</b>	0.796	0.550	1.130	0.156

In this section, it is observed that the significance level of the test is higher than the standard, that is, 0.5 ( $P > 0.05$ ) which indicates the normality of distribution of data.

## 4.3.2.2 Normality Test (Experimental Group)

Table 4. Results of Kolmogorov-Smirnov test for spiritual intelligence in the control group

Spiritual intelligence	Spiritual intelligence in post-test		Spiritual intelligence in pre-test	
	SK-test	Sig.	SK-test	Sig.
<b>Critical existential thinking</b>	0.675	0.752	0.819	0.514
<b>Production of personal meaning</b>	0.592	0.875	0.720	0.678
<b>Transcendental consciousness</b>	1.153	0.140	0.822	0.509
<b>Expanded state of consciousness</b>	0.474	0.978	0.649	0.793

In this section, it is observed that the significance level of the test is higher than the standard, that is, 0.5 ( $P > 0.05$ ) which indicates the normality of distribution of data.

## 4.3.2.3 Results of Levin Test

## 4.3.2.3.1 Results of Levin Test in Determining Consistency of Variances

Table 5. Results of Levin test in determining consistency of variances

	F	df1	df2	Sig.
<b>Critical existential thinking</b>	4.366	1	38	0.088
<b>Production of personal meaning</b>	2.937	1	38	0.095
<b>Transcendental consciousness</b>	3.425	1	38	0.123
<b>Expanded state of consciousness</b>	4.231	1	38	0.90

Since the significance level of test is higher than the considered error (0.05), the hypothesis of consistency of variances is confirmed.

## 4.3.2.4 Homogeneity of the Matrix of Variance-Covariance

The results in this section show that the hypothesis of the homogeneity of variance-covariance is held ( $p = 0.112$ ,  $df2 = 283226.420$ ,  $df1 = 15$ , Box's  $M = 22.058$ ).

Table 6. Homogeneity of the matrix of variance-covariance

<b>Box's M</b>	<b>23.821</b>
F	2.588
df1	45
df2	452322.801
Sig.	0.085

## 4.3.2.5 The Results of Multivariate Covariance

In this section, the results have been presented in the form of four multivariate tests that these results are given in Table 7 in which based on the results obtained for Wilks' Lambda, the data have been interpreted.

Table 7. The summary of the analysis of multivariate covariance for spiritual intelligence

Effects		Value	F	Given df1	df of error	Sig.	Effect size
<b>Groups</b>	Pillai's Trace	0.910	43.120	9.000	29.000	0.000	02.9
	Wilks' Lambda	0.087	43.120	9.000	29.000	0.000	02.9
	Hotelling's Trace	13.539	43.120	9.000	29.000	0.000	02.9
	Roy's Largest Root	13.539	43.120	9.000	29.000	0.000	02.9

Table 7 shows that Wilkes lambda index of the group at the significance level of 0.01 is significant (Wilks Lambda=0.087; F=43.120; P=0.000;  $\eta^2 = 0.920$  ). In other words, it could be argued that at least there is significant difference between experimental and control groups in one of the components of spiritual intelligence.

In order to know that the difference between the two experimental and control groups is related to which components, the univariate analysis with error correction type I by Bonferroni method was used:

Table 8. Analysis of between-subject covariance to examine the effect of subjects on the components of spiritual intelligence

Change source	Variable	Sum of squares	df	Mean squares	F	Sig.	Effect size	Test power
<b>Groups</b>	Critical existential thinking	26.338	1	26.338	39.042	0.000	0.513	1.000
	Production of personal meaning	11.656	1	11.656	56.886	0.000	0.606	1.000
	Transcendental consciousness	24.531	1	24.531	25.087	0.000	0.404	0.998
	Expanded state of consciousness	12.450	1	12.450	16.377	0.000	0.307	0.976

According to the table above, considering the adjusted Bonferroni alpha (0.008), f-value (of experimental and control groups) in the four variables of critical existential thinking, production of personal meaning, transcendental consciousness, and expanded state of consciousness is significant. In other words, there was no significant difference between the experimental and control groups in the components of spiritual intelligence. Therefore, we can claim that yoga exercises play an important role in the formation of spiritual intelligence in the components of critical existential thinking, production of personal meaning, transcendental consciousness, and expanded state of consciousness.

## 5. Results

### 5.1 Spiritual Intelligence in the Experimental Group

The results of the descriptive analysis of the spiritual intelligence variable for the experimental group separately in pre-test and post-test are as following:

- 1) Critical thinking (2.75-3.21)
- 2) Production of personal meaning (2.85-3.27)
- 3) Transcendental consciousness (2.54-3.39)
- 4) Expanded state of consciousness (2.5-3.48)

The resultant of findings in this section confirms that the increase in individuals' spiritual intelligence has been due to yoga exercises.

### 5.2 Spiritual Intelligence in the Control Group

As can be expected, the results of descriptive analysis of spiritual intelligence in the control group in pre-test and post-test were not significantly different. The averages of the intended components are as follows:

- 1) Critical thinking (2.91-2.81)
- 2) Production of personal meaning (2.91-2.79)
- 3) Transcendental consciousness (2.43-2.5)

#### 4) Expanded state of consciousness (2.62-2.51)

As can be seen there was no significant difference between the averages of the control group in pre-test and post-test.

### 6. Discussion and Explanation of Findings

In this study, the effect of yoga on spiritual intelligence was studied, so that according to obtained results from analysis of covariance and significance level of the test ( $P < 0.01$ ), it was observed that yoga had a positive and significant effect on increasing the individuals' spiritual intelligence in such a way that the findings of this study showed that 51.3% of variance in "critical existential thinking", 60.6% of the variance in "production of personal meaning", 40.4% of the variance in "transcendental consciousness" and 30.7% of variance in "expanded state of consciousness" in air traffic controllers in Tehran flight control center are explainable by yoga that each sub-scale has been explained and discussed separately in the following section.

In accordance with the findings of this study, yoga has a positive and significant impact on spiritual intelligence in the component of critical existential thinking. This component of spiritual intelligence indicates an individual's deep thinking towards the world, the concept of events in life and thinking in the nature of realities (King, 2007). Yoga trainers consider yoga exercise effective on individuals' deep thinking and know it as the effect of yoga on Prana (Mousavinasab, 2008). Prana can be defined as the energy of all particles in the universe that is exactly similar to air, but it is not air. It is while that the Prana appears in the physical aspect as movement and activity and in the mental aspect as thought. Accordingly, it can be expected that yogi people enjoy higher critical existential thought by using yoga exercises that was confirmed in this study. Using yoga exercises and Pranayama (breath control), people try to see the macrocosm within the microcosm and by getting worldly powers try to transcend themselves. This important issue can be one of the reasons that justify the impact of yoga on the increase of higher critical existential thinking. From the perspective of some yoga trainers (Rahimifar et al., 2011) this effect can also be pursued through the impact of yoga on the fifth chakra (Vishuddhi). In the medication perspective, this chakra affects thyroid and parathyroid glands and its related field is the faith and inspiration that its output can be seen in improvement of critical and existential thinking. On the other hand, the sixth chakra (Ajna) is also among the cases that in the field of yoga that can explain this possible effect. In yoga, the sixth chakra (Ajna) has been called the eye of wisdom or the eye of knowledge which is known as related with understanding and illumination and is affected by stimulating individual's hypophysis (pituitary) gland (Rahimifar et al., 2011).

Another component of spiritual intelligence that in the present research the effect of yoga on it was reported significant is the production of personal meaning which is called the individual's ability to find objective and orientation of life so that at the time of failure people use this ability and are looking for a meaning in this defeat that has affinity with self-knowledge in emotional intelligence in terms of meaning (King, 2007). In yoga, it has been stated that the most important location of its manifestation can be seen in the effect of yoga on seventh chakra, named Sahasrara that is known in relation with devotion, inspiration, selflessness and spiritual understanding and accordingly, we can theoretically justify the effect of yoga on this dimension (Rahimifar et al., 2011). Yoga is also an effective factor to strengthen believing in meaning and believing in the Creator with the power to stimulate thought and peace that in terms of meaning it has been stated as equal to production of personal meaning in spiritual intelligence (Khalsa, 2004). Based on this, it can be expected that we could increase self-attention by applying yoga exercises and realize the higher meaning production as one of the aspects of spiritual intelligence through creation of in-depth thinking in life affairs.

In the third dimension of spiritual intelligence the subject of transcendental consciousness raises, in which in accordance with the findings of the research, yoga had a significant effect on it. In connection with this dimension, it is stated that the individual's knowledge from unnatural aspects, the deeper relationship between the individual with other people, a spiritual approach to internal dimensions of the self, and thinking of the existence are considered due to a superpower like God (King, 2007). The possible effect of yoga on the transcendental consciousness of spiritual intelligence can be explained by some brain activities influenced by yoga (Ameram & Dryer, 2007). In line with the findings of other researchers (Becker, 2000), those to whom deep meditation had been taught, their frontal cortex had more activity than other people that which is considered due to the effects of the brain limbic system for spiritual experiences, especially the mystical experiences of oneness and unity (Ameram & Dryer, 2007). One of the most important issues of Hatha yoga is coordination between the systems of the physical body, Pranic body and mental body that the most important of them is the awakening of the spiritual transmission channel. This channel which is along the spine is the factor of the Kundalini power transmission from the root chakra (the first chakra) to the seventh chakra (Sahasrara) or

absolute knowledge; superior consciousness is achieved after the unity of these two forces (Mousavinasab, 2008). Accordingly it can be expected that by more and deeper care in the individual, yoga provides the ground for appearance of transcendental consciousness that was confirmed in the present study. Finally in the fourth dimension of the spiritual intelligence, the expanded state of consciousness raises that it was reported in the present study that yoga had a significant effect on it; this state has been known equal to self-consciousness (King, 2007). In line with the results of this research, some researchers have reported that yoga exercises are effective on self-consciousness (Becker, 2000) and in connection with the effects of yoga, they have referred to factors such as the strengthening of attention and focus as indices explaining the expansion of consciousness (Khalsa, 2004). In explaining this effect, it has been stated that as a result of daily practice and fostering care and attention, the relationship between mind and body reinforces and after a while not only the knowledge about body increases, but also the focus of mind becomes stronger and clearer. In these circumstances, any part of the body on which you focus attracts your mind in such a way that the possibility of penetration of the other thoughts will be reduced (Mahdavi-pour Fard, 2007). Those who in doing their daily exercises coordinate their body movements with breathing, in fact, train the mindfulness, coordination of mind and body and being in the present moment to all brain units and body cells that is typically the same mindfulness. In this regard, it has been explained that yoga causes the mind to be controlled and human reaches a higher consciousness (Mousavinasab, 2008). On this basis, in accordance with the findings of the present study we can expect that yoga exercises improve individuals' self-consciousness through mind control. It should be noted that air traffic controllers need to have high intelligence due to their important responsibility to regulate and organize air traffic programs. Getting a high score in spiritual intelligence in this group of employees due to enjoyment of characteristics such as humility and forgiveness, along with believing in God (especially in stressful and anxious emergency situations in air traffics) brings about higher relaxation and concentration.

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