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Analytical study of geometric motifs in Zahak dreaming picture in Tahmasebi Shahnameh
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Orginal Research Article
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Analytical study of geometric motifs in Zahak dreaming picture in Tahmasebi Shahnameh

Abstract

Problem Definition: Tahmasebi Shahnameh is an exquisite manuscript of Ferdowsi Shahnameh which belongs to the tenth century AD. This edition contains 258 paintings of the legends, myths, epic poems and stories of Shahnameh in 1200 pages, illustrated by the most prominent painters and calligraphers of the Safavid era. The paintings of Tahmasebi Shahnameh are of great artistic value and many decorative motifs have been employed in them. The geometric decorative motifs are considered as the most prominent and common ones in these paintings. The painting of Zahak dream is one of the drawings of this Shahnameh in which many decorative geometric motifs can be observed in various and beautiful compositions. The important place of geometric decorative motifs in Islamic art decorations, especially painting, has been the main concentration of the present research. It has been attempted to answer the question that what is the maximum number of repetitions of geometric motifs in this drawing?

Objective: The present study aims to quantitatively and qualitatively identify the decorative and geometric patterns of Zahak dream painting as an important Iranian visual documents.

Research Method: The required information has been collected from library sources and historical documents and have been presented with a qualitative approach and in a descriptive-analytical manner.

Results: The present results indicated that a number of 26 geometric compositions are present in Zahak dream painting of Tahmasebi Shahnameh. These compositions are composed of 19 types of geometric patterns, among which, the geometric patterns, regular hexagons and six feathers Shamsa met the highest amount of repetition in the studied drawing, respectively.

Keywords: Iranian painting, Geometric motifs, Zahak dream painting, Tahmasebi Shahnameh.

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Introduction

Iranian painting is one of the arts which is full of decorations and artists have employed various geometric and plant motifs in creating their paintings. The drawings of Tahmasebi Shahnameh are important images containing all kinds of decorative and geometric motifs and so on. Zahak dream painting is one of the drawings of Tahmasebi Shahnameh in which many geometric motifs can be observed. The importance of the place of these motifs in Islamic art and especially Iranian painting is the subject of the present research and in this regard, the question arises that what is the maximum repetition of geometric motifs in this painting? The present research seeks to answer this question. To this aim, Zahak dream drawing in Tahmasebi Shahnameh has been first introduced and then the definitions of geometry, geometric motifs or geometric knots have been presented. Finally, the geometric motifs in Zahak dream painting have been analyzed.

Research Method

The present research has been conducted through the qualitative analysis of library and documentary information and with a descriptive-analytical approach. The example examined in the present study includes Zahak dream painting and the studied variable includes the various types of geometric motifs and combinations or geometric knots in this artwork.

Research Background

Literature review illustrates that an article has been published by Sadri and Esmati (2019) on Zahak dreaming entitled “The morphology of Tahmasbi Shahnameh paintings with dream subject based on Propp’s theory”. Baniasadi (2014) investigated this painting in another study from the perspective of illustration. However, none of the above studies have examined the geometric decorative motifs in the drawing. In this regard, the present research has dealt with these motifs which is considered as its distinguishing feature from the literature. Among the studies conducted in the field of geometric motifs in Islamic art and painting, one can also refer to the article entitled “The study of Islamic geometric motifs in the paintings of Timurid Zafarnameh” written by Shirvani and Rezvani (2017). The results of this research indicated that out of 24 Paintings of Zafarnameh, 12 ones have geometric knot designs and a total number of 34 knot types have been identified among these paintings, and the most knots used in Zafarnameh are related to six feathers Shamse, eight and six Shamseand rotating drum. In another study, Shayestehfar and Sedrehneshin (2013) compared a variety of decorative motifs including the geometric motifs in the painting with the architectural decorations of the Timurid period. The results of this comparison indicated that Kamal Al-Din Behzad has created the painting “A beggar at the door of the mosque”

taking into account the architecture of the Timurid era and inspired by their motifs as well as using these decorative elements in a new space.

Several theses have also been carried out in this regard. Malekian (2017) investigated the effect of geometric decorations of Timurid and Safavid architecture on the paintings of Tahmasebi Shahnameh. Also, Mohammad Talebi Tarmazdi (2017) studied the arithmetic and geometric features of brickworks of houses in Jolfa neighborhood of Isfahan and compared these motifs with geometric ones associated with the paintings of Safavid period. Furthermore, "The Impact of motifs and geometric patterns of Herat School's drawings on the contemporary Iranian painting" by Shokri (2014), "Reflection of the architectural decorations in the miniature of Safavid era" by Namdar Siuaki (2011) and "A study on the geometric motifs (knots) in Tahmasebi (Tabriz School) and Baysonghor (Herat School) Shahnamehs by Raisi (2013) are among other relevant researches.

Zahak dream painting in Tahmasebi Shahnameh

Zahak is one of the mythological characters of Shahnameh. Zahak is the filthy and ill-natured son of Mardas, Shah of Saudi Arabia who is deceived by the devil, kills his father and comes to power (Mesbah, 2017, 50) The devil, in the form of a handsome and adorned youth, becomes the cook for Zahak's kitchen and kisses him on the shoulder due to his inappropriate actions, and thus two black snakes grow on Zahak's shoulder, which are fed only by the human brain (Moeini, 2010, 26). Zahak has ruled the earth for about a thousand years, during which many young people are killed to feed his snakes. Forty years prior to his overthrow, Zahak had a dream in which "three warriors, one of whom was a bit younger, came to him with a cow head wand in his hand, struck his expensive wand on his head, put a bridle around his neck, dragged him until Damavand Mountains and tied him up" (Mesbah, 2017, 50).In Tahmasebi Shahnameh, Zahak dreaming has been depicted in one of the paintings. The artist has illustrated the facial expressions, movements and distinctive costumes of the courtiers with great care and elegance, and has also shown the tile motifs and architectural details (Blair & Bloom, 2002, 432). Zahak's palace has been also depicted in this patterned work and includes two parts and each part has two floors. The construction on the right is the interior painting and Zahak's harem, where a relatively small balcony is attached to the main space of the palace, and several heavy narrow wooden handles surround this appendant space. Also, the shelter of the roofs is clearly drawn with a lot of motifs. A small octagonal pool can also be seen at the bottom of the frame (Namdar Siouki, 2011, 72-73). The content of the story narrates Zahak dreaming at the midnight. However, all the details are depicted with full light and clarity in the painting, and it seems that the meadows outside the palace are painted with darker colors to show the night and darkness. It should also be noted that a very small space of the drawing is dedicated to the text and inscription. Figures 1 & 2 depict Zahak dream painting and details of the poems of its inscription, respectively.

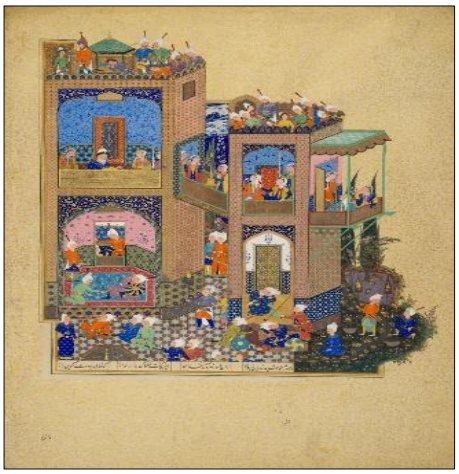


Figure 1.
Zahak dream painting, by Mir Musavvir, Tahmasebi Shahnameh. Source:upload.wikimedia.org /wikipedia/commons /0/02/Mir_Musavvir _002.jpg?uselang=fa

Figure 2.
Details of the inscription of Zahak dream painting, by Mir Musavvir, Tahmasebi Shahnameh. Source: upload.wikimedia.org/wikipedia/commons/0/02/Mir_Musavvir_002.jpg?uselang=fa

Definition of geometry, geometric motifs or knots

"Geometry is one of the principles of mathematics and it is a science in which the conditions of quantities and dimensions are discussed" (Dehkhoda, 1998, 20837). In another definition, it is stated that "Geometry is the field of mathematics that makes the study of space, shapes and objects conceivable in this space" (Sharifzadeh, 2006, 2). Also, geometry is a spatial order obtained by measuring the relationships between the shapes (Lawlor, 1989, 7). In ancient times, geometry included all the mathematical sciences and other branches such as algebra and so on. Geometry is equivalent to geometrie in French and both of them have been derived from the Latin word geometria which is again derived from the Greek word γεωμετρία. It is also composed of the two words geo meaning earth and metria meaning measurement. Therefore, geometry has been the science of measuring the earth in ancient times (Raisi, 2013, 123). Today, geometry is referred to as a field of science which "discusses shapes, angles, their values, properties and relationships with each other" (Maher al-Naghsh, 1982, 37). The geometry of motifs also refers to how to draw patterns (Raisi, 2013, 125). The geometric motifs or knots are different textures of regular geometric shapes (Rezvani, 2015, 11). According to Necipoğlu, they are harmonious combination of intertwined, rhythmic and attractive geometric shapes formed by using straight lines (Najiboglu, 2001, 130). Also, in another definition, a knot is a set of various geometric shapes that have been used together in a coordinated manner and in a specific order in specific fields (Samanian, 2008, 7). Bozorgmehri has also described the knot as a

very regular style of geometric motifs with a special set of mathematically definable elements (Bozorgmehri, 1981, 120). It should be mentioned that geometric motifs have many applications in Islamic art such as architecture and associated decorations, wooden arts, painting, etc. In the current research, the geometric motifs drawn in Zahak dream painting have been analyzed.

Analysis of geometric motifs in Zahak dream painting

There are many decorative motifs in Zahak dream painting, among which the variety of geometric motifs is considered as the most interesting ones. Analyzing the work, a number of 26 geometric compositions have been identified in this painting, which are also composed of 19 types of motifs. These 26 different geometric knots, from the combination of geometric motifs of the eight and six Shamse, triangle, rectangle, square, Regular hexagon And regular octagon octagon, tubercular, double- and three-tubercular, rectangular mat, drum, low bergamot and lozenge and equilateral lozenge, tally, six loose or six drums, six long and jagged which have been depicted in Zahak dream painting. Table 1 shows various geometric combinations or knots in Zahak dream painting together with their linear designs.

Table 1 Various types of geometric combinations or knots in Zahak dream painting Source: Authors

Image of geometric and graphic designs		

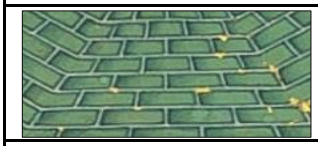
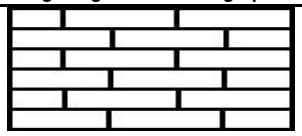

	

Figure1. Rectangle. Source: wikimedia.org	**Figure2.** Rectangular linear design . Source: Namdare Siuraki, 2011, 205.	**Figure3.** Rectangular mat and eight Shamse in the middle of it. Source: wikimedia.org

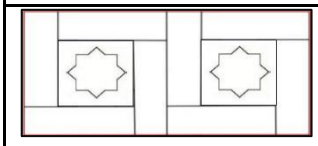
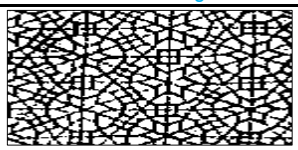
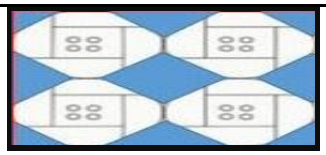

		

Figure4. Linear design of rectangular mat and eight Shamse in the middle of it. Source: wikimedia.org	**Figure5.** Eight and six Shamse knot. Source: .wikimedia.org	**Figure6.** Linear design of eight and six Shamse knot. Source:.wikimedia.org
		
Figure7. Combine mat design with rectangle and square pattern. Source:.wikimedia.org	**Figure8.** Linear design of Combine mat design with rectangle and square pattern. Source:.wikimedia.org	**Figure9.** Two lines tubercular. Source:.wikimedia.org

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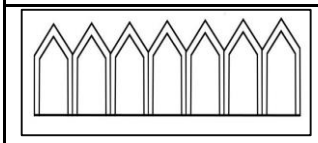
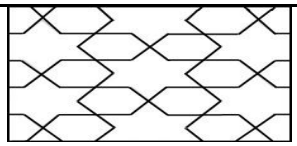
		

Figure10. Linear design of Two lines tubercular. Source:Namdare Siuraki, 2011, 205.	**Figure11.** Six and Shamse knot. Source:.wikimedia.org	**Figure12.** Linear design of Six and Shamse knot. Source:Namdare Siuraki, 2011, 205

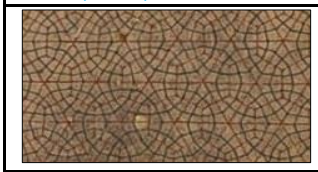
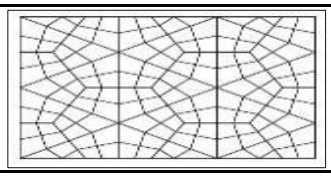
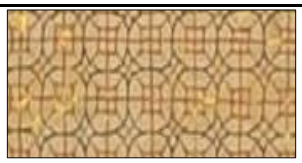

		

Figure13. Six knot and rotating drum. Source: .wikimedia.org	**Figure14.** Linear design of Six knot and rotating drum. Source: Mohammad Talebi Tarmazdi, 2017, 86.	**Figure15.** Eight knot and Sabonak. Source: .wikimedia.org

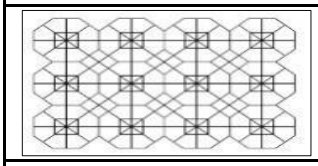
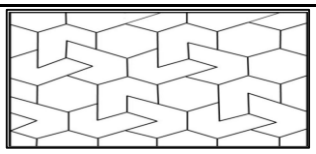

		

Figure16. Linear design of Eight knot and Sabonak. Source: Mohammad Talebi Tarmazdi, 2017, 86.	**Figure17.** Regular hexagon and triple ubercular knot. Source: .wikimedia.org	**Figure18.** Linear design of Regular hexagon and triple-tubercular knot. Source: Namdare Siuraki, 2011, 198.

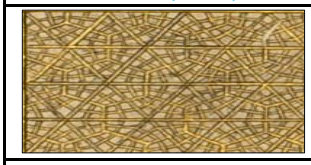
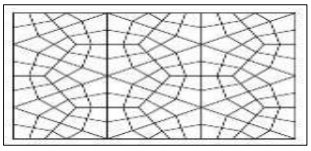
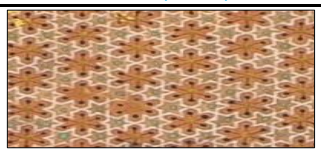

		

Figure19 Six and rotating drum knot. Source:.wikimedia.org	**Figure20** Linear design of Six and rotating drum knot. Source: Mohammad Talebi Tarmazdi, 2017, 86.	**Figure21** Six and Shamse motifs. Source: .wikimedia.org

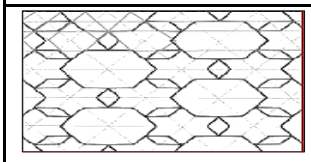
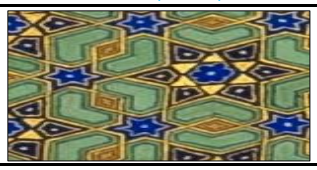
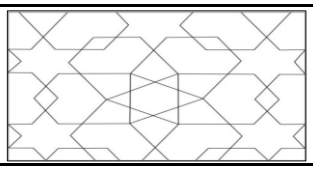

		

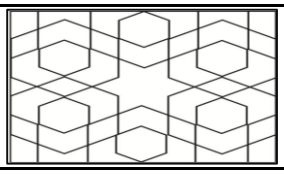
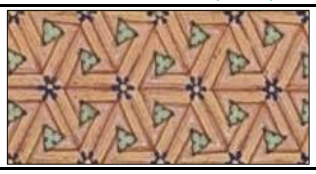
Figure22 Linear design of Six and Shamse motifs. Source: Shokri, 2014, 57.	**Figure23** Six Shamse and lozenge and double-tubercular. Source:.wikimedia.org	**Figure24** Linear design of Six Shamse and lozenge and double-tubercular. Source: Namdare Siuraki, 2011, 198.
		

Image of geometric and graphic designs		
Figure25 Knots six sharp and slow with a broken tally. Source: wikimedia.org	**Figure26** Linear design of Knots six sharp and slow with a broken tally. Source:Namdare Siuraki, 2011, 197.	**Figure27** Six and rotating six. Source:.wikimedia.org

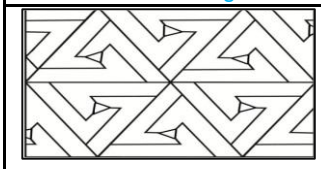
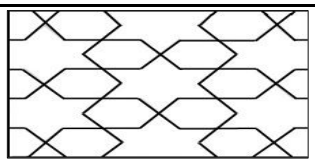

		

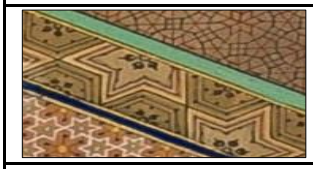
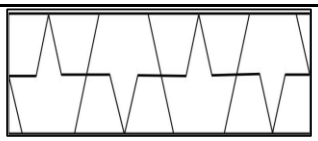
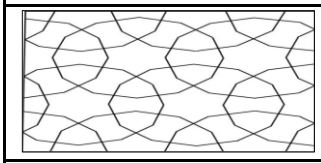
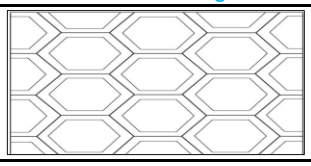
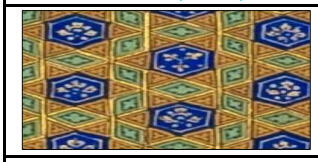
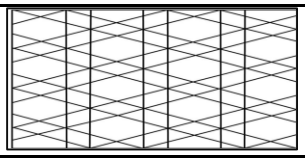
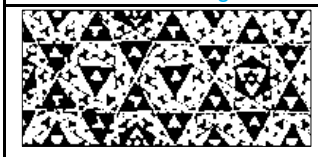
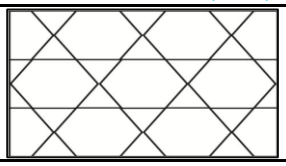
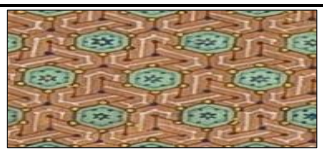
Figure28 Linear design of Six and rotating six. Source: Namdare Siuraki, 2011, 198.	**Figure29.** Six and Shamse knot. Source:.wikimedia.org	**Figur30.** Linear design of Six and Shamse knot. . Source: Namdare Siuraki, 2011, 196.
		
Figur31. Six shames and Regular hexagon knot. Source: .wikimedia.org	**Figur32.** Linear design of Six shames and Regular hexagon knot. Source: Namdare Siuraki, 2011, 206.	**Figur33.** Six in six, or combination of six Shamse and six loose and sharp drums. Source: .wikimedia.org
		
Figur34. Linear design of Six in six, or combination of six Shamse and six loose and sharp drums. Source: Namdare Siuraki, 2011, 197.	**Figur35.** Regular hexagon knot. Source: .wikimedia.org	**Figur36.** Linear design of Regular hexagon knot. Source: Namdare Siuraki, 2011, 196.
		
Figur37. Six and Shamse and Two lines rotating lozenge. Source:wikimedia.org	**Figur38.** Linear design of Six and Shamse and Two lines rotating lozenge. Source:Namdare Siuraki, 2011, 203.	**Figur39.** Combination of six Shamse and regular hexagon. Source:wikimedia.org
		
Figur40. Black and white design of Combination of six Shamse and regular hexagon.	**Figu41.** Linear design of Combination of six Shamse and regular hexagon. Source:Namdare Siuraki, 2011, 196.	**Figur42.** Six and seh lenge knot. Source:.wikimedia.org

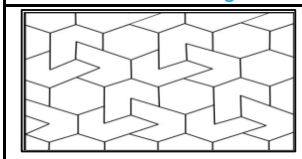
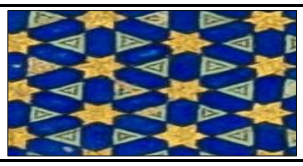
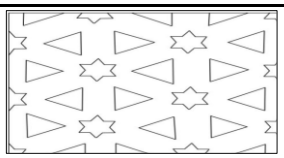
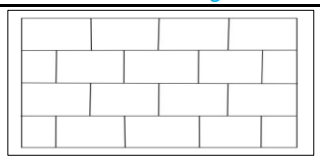
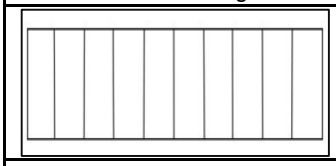
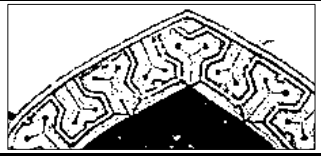
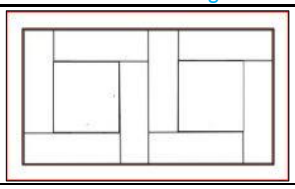
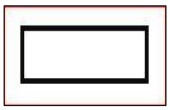
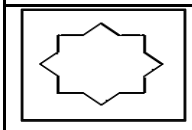
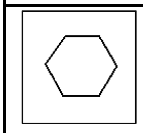
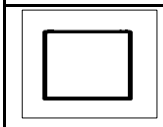
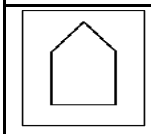
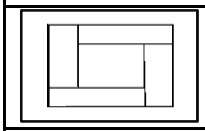
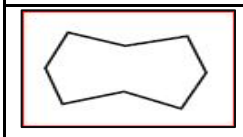
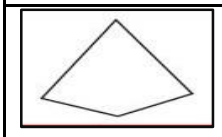
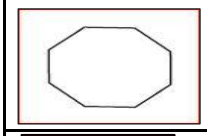
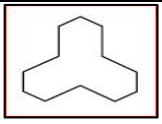
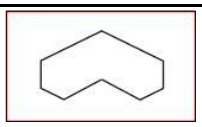
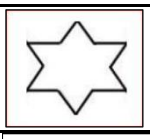
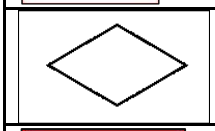
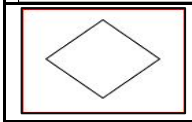
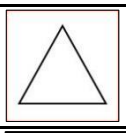
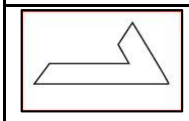
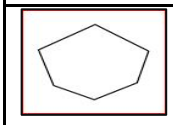
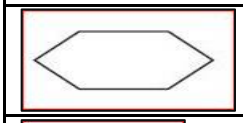
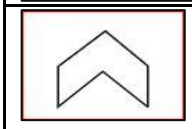
Image of geometric and graphic designs		
Source:.wikimedia.org		
		
Figur43. Linear design of Six and seh lenge knot. Source: Namdare Siuraki, 2011, 198.	**Figur44.** Combination of six Shamse and long six and triangle. Source:.wikimedia.org	**Figur45.** Linear design of Combination of six Shamse and long six and triangle. Source:Namdare Siuraki, 2011, 200.
		
Figur46. Square. . Source:.wikimedia.org	**Figur47.** Linear design of Square. Source: Namdare Siuraki, 2011, 199.	**Figur48.** Rectangle. Source:.wikimedia.org
		
Figur49. Linear design of Rectangle. Source:Namdare Siuraki, 2011,207.	**Figur50.** Three-tubercular motif. Source: .wikimedia.org	**Figur51.** Three-tubercular motif. Source: .wikimedia.org
		
Figur52. Linear design of three - tubercular motif. Source:.wikimedia.org	**Figur53.** Linear design of three - tubercular motif. Source:.wikimedia.org	**Figur54.** Drum with Rectangle. Source:.wikimedia.org
		
Figur55. Linear design of Drum with Rectangle. Source: .wikimedia.org		

Table 2 also presents the repetition number and percentage of each of the above-mentioned geometric motifs.

Table 2. The repetition number and percentage of different types of geometric motifs in the compositions or geometric knots in Zahak dream painting. Source: Authors

picture and name of geometric pattern		Number of repetitions of motifs in geometric compositions	Percentage of motifs repetition in geometric compositions
	Rectangle. Source: Authors	5	19,23%
		Figures 1, 3, 7, 48 and 54 from Table 1	
	Eight Shamse. Source:chap.sch.ir	1	3,84%
		Figure 3 from Table 1	
	Regular hexagon. Source: chap.sch.ir	14	53,84%
		Figures 6, 11, 13, 15, 17, 19, 21, 23, 30 , 31, 35, 37, 39 and 42 from Table 1	
	Square. Source: Mohammad Talebi Tarmazdi, 2017, 51.	6	23.07%
		Figures 3, 5, 7, 15, 46 and 54 from Table 1	
	Tubercular. Source: chap.sch.ir	1	3,84%
		Figure 9 from Table 1	
	Rectangular mat. Source: Authors	3	11,53%
		Figures 3, 7 and 54 from Table 1	
	Drum. Source: chap.sch.ir	3	11,53%
		Figures 13, 19 and 33 from Table 1	
	Slow bergamot. Source: chap.sch.ir	3	11,53%
		Figures 13, 19 and 23 from Table 1	
	Regular octagon. Source: chap.sch.ir	1	3,84%
		Figure 15 from Table 1	
	Three-tubercular. Source: chap.sch.ir	3	11,53%

picture and name of geometric pattern		Number of repetitions of motifs in geometric compositions	Percentage of motifs repetition in geometric compositions
		Figures 17, 42 and 50 from Table 1	
	Double - tubercular. Source: chap.sch.ir	1	3,84%
		Figures 23 from Table 1	
	Six Shamse. Source: Authors.	13	50%
		Figures 5, 11, 13, 19, 21, 23, 25, 29, 31, 33, 37, 39 and 44 from Table 1	
	Lozenge. Source: Authors.	5	19,23%
		Figures 13, 19, 23, 25 and 37 from Table 1	
	Equilateral Lozenge. Source: Authors.	2	7,69%
		Figures 7 and 15 from Table 1	
	Triangle. Source: Authors.	7	26, 92%
		Figures 13, 19, 23, 27, 37, 39 and 44 from Table 1	
	Tally. Source: chap.sch.ir.	1	3,84%
		Figures 27 from Table 1	
	Six loose or six drums. Source: chap.sch.ir.	3	11,53%
		Figures 13, 19 and 33 from Table 1	
	Six long. Source: chap.sch.ir.	2	7,69%
		Figures 25 and 44 from Table 1	
	Jagged. Source: chap.sch.ir.	1	3,84%
		Figures 25 from Table 1	

The present investigations show that the most frequent motifs in the painting are regular hexagon and Six Shamse with 14 and 13 times, which account for 53.84 and 50% of various geometric knots, respectively. The triangle and square can be observed in 7 and 6 compositions or geometric knots, respectively. In other words, the motifs of triangle and square meet the frequencies of 26.92 and 23.07% among the various geometric knots in the painting, respectively. In addition, the rectangle and lozenge have been repeated in 5 geometric Knots and with a frequency of 19.23% in the drawing. Also, the motifs of drums, slowe bergamot, rectangular

mat, three-tubercular, six loose or six drums have been repeated in 3 types of geometric knots with a frequency of 11.53%. Further to these, the motifs of six long and equilateral lozenge have been also drawn in 2 different geometric compositions with a frequency of 7.69%. It should be noted that the eight shams, tubercular, regular octagons, double-tubercular, tally and jagged motifs also exist in only 1 geometric knot with a frequency of 3.84% of various geometric knots in the painting.

Conclusion

The present findings illustrated that there are 26 geometric compositions or knots in Zahak dream painting, which are also composed of 19 different types of motifs. The examination of various types of these geometric motifs and their frequency indicated that the regular hexagon and eight knot geometric patterns with 14 and 13 times and frequency percentages of 53.84 and 50%, respectively, meet the highest repetition in the geometric decorations of Zahak dream painting. The importance of extracting and classifying decorative motifs, especially geometric motifs in the painting, is mainly due to the presentation of design patterns and motifs in accordance with Iranian art and culture, which can serve as a resource for designers and artists in various fields such as textile and clothing design, decorations for dishes, functional accessories and jewelry.

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