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<https://doi.org/10.15017/2560373>

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出版情報 : 芸術工学研究. 32, pp.1-8, 2020-03-19. Faculty of Design, Kyushu University

バージョン :

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## A study on the relationship between Persian rug patterns and Morton Feldman's musical notation

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### 著者抄録

絨毯のデザインと音楽は、多様性における統一というアイデアにフォーカスしたコンセプトを表現するために象徴的な言語を使った芸術と考えられる。ペルシャ絨毯の織りは、織師の心的な地図 (mind map) に基づいているが、それは、楽譜における音型をオリエンタルな織物をもつ具体性に結びつけるモートン・フェルドマンの音楽的アプローチに近いように思われる。しかしながら、このような関係は、まだ詳細には研究されていない。ここでは、絨毯のパターンがもつ重要な要素に着目し、音楽における類似性を生み出すように試みた。この研究では、ペルシャ絨毯とフェルドマンの作曲上のアプローチにおける反復と対称性との関係性が解き明かされている。

### 1. Introduction

Rug design and music are considered as arts which use symbolic language to express certain concepts with a focus on the idea of unity in multiplicity. Musical terms such as rhythm, texture, and harmony refer both to textile pattern and to music (Dalvandi et al. 2010; Kuloglu 2015), and a few researchers have studied the connection and relationships between weaving texture and music elements. For example, American composers Lansky and Goldstein (1974) characterized the word texture as 'the characteristic disposition or connection of threads in a woven fabric'. Mundry (2009), a German music composer characterized the significance of patterns in her musical composition *No One*, which was influenced by a textile pattern of the African Bakuba tribe with interweaving contours and large transformations. Mundry (2009) linked the concept of African texture pattern to the parameter of time and Western music notation. Naroditskaya (2005) compared Eastern music (a specific *mugham* 'Rast') and Eastern weaving texture (a specific carpet '*Shakhnazarli*') and suggested *mugham* (classical Azerbaijani music) and rug weaving are related structurally, semitonically, and socially in Azerbaijani culture. Morton Feldman, an American music composer, explored the visual elements of textiles in music linking the patterns in his scores to the materiality of Oriental rugs (de Zepetnek et al. 2011). Feldman as a pioneer in music requiring improvisation believed "music and the designs or a repeated pattern in a rug have much in common" (Whittington 2008). Repetition and variation are the main strategies in Feldman's music. These are the features he extracted from

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observation of rug design and connected Oriental weaving rug pattern to Western music notation, which are rarely studied by researchers.

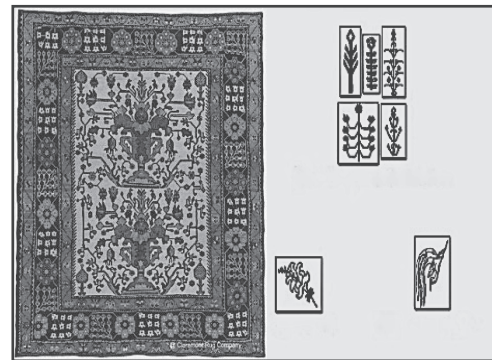
Weaving patterns express the identity of the weaver, community, and country through esoteric designs that encode the vision of the world. The hand-knotted Persian rug, a subgroup of Oriental rugs specifically woven in Iran (Persia), is one of the oldest surviving crafts and one of the greatest manifestations of traditional Persian art and culture, which has also received international acknowledgement for its artistic majesty (Eiland 1998; Herbert 1982). Weaving of some Persian rugs such as Bakhtiari rugs is based on a weaver's mind map and improvised by weavers which might be close to Feldman's approach who linked the Oriental rug patterns in his scores. However, the relationship between them has not been studied in Persian rugs.

This study, therefore, focuses on the possible relationship between Persian rug weaving patterns and the music notation of Morton Feldman, by utilizing the elements and principles found in both, such as repetition, rhythm, and symmetry. In exploring these relationships, the following question will be addressed: Are the elements and principles in music (repetition, rhythm, and time) related to the same elements and principles in weaving Persian rug design? To answer the question, first we examine the design of Persian rugs, particularly, the Bakhtiari rug. And second, we compare the relationship between the weaving pattern in Persian rugs and the patterns in Morton Feldman notation.

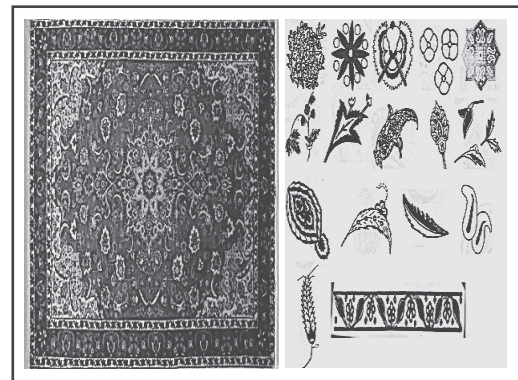
## 2. Three major rug designs in Persian rugs

Persian rugs are generally named after the village or town where they are woven or collected, or they are named after the weaving tribe in the case of nomadic pieces. Each rug's particular pattern, palette, and weave are uniquely linked with the indigenous culture, and weaving techniques are specific to an identifiable geographic area or nomadic tribe. In general, the characteristics of Persian rugs are comprised of graceful, flowing lines of design, well-ordered composition, mellow, rich-hued harmony of the color, popularity of floral motives, and frequent introductions of animal, and even human forms, and the presence of a cotton 'Warp' (Breck and Morris 1923; May 2009).

**a) Rectilinear design (sometimes called geometric).** The design is more of a rectilinear, and broken lines and geo-metric lines utilizing nature.



**b) Curvilinear and floral design.** In this design, drawings such as flowers and blooms are used.



**c) Pictorial design.** The kings, soldiers, animals, and hunting ground are used in this design.

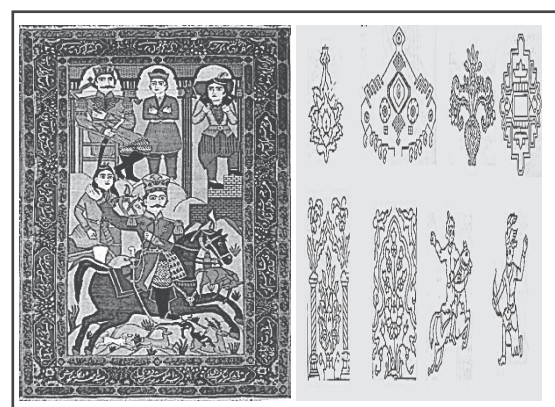


Figure 1. Three major rug designs in Persian rugs. a) Rectilinear designs, b) Curvilinear and floral design, c) Pictorial design. Rug photos from Forugh Esmaeili.

The design of Persian rugs has numerous variations, and these designs can fall into three major categories: (a) a rectilinear (sometimes called geometric) design (Fig.1-a); (b) a curvilinear and floral design (Fig.1-b); and (c) a pictorial design (Fig. 1-c) (Herbert 1982). There are a number of patterns which are found in Persian and Oriental rugs called 'motifs', and these designs have different meanings and tend to be used depending on the area where the rug was woven, although it is not unusual to find more than one motif in a single rug. Persian rugs, and rugs in general, have a limited number of layouts. Almost all of these have a number of elements in common, including the field patterns, a border or multiple borders and some form of medallion or pattern (Fig. 2).

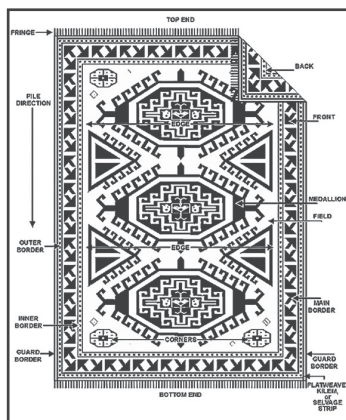


Figure 2. Rug motifs/layouts  
(<https://www.little-persia.com/rug-guides/rug-design>)

Among the many types of Persian rugs, the Bakhtiari rug is famous for its exquisite composition and long-lasting qualities, and these rugs are always welcomed by buyers because of their texture and designs. Unique geometrical motifs and color combinations contribute to its one of a kind style (Nassir 2010). The Bakhtiari rug, unlike other carpet types, does not have weave maps, and it is based on the weaver's creativity, similar to music which is created based on the composer's mindset. The weavers, with their inventive and selected shapes and elements which were considered holy or valuable and are illustrated in a stylized and completely symmetrical way on the carpet, create different patterns which will be discussed in the next section.

### 2.1. The characteristics and patterns of Bakhtiari rugs

Bakhtiari rugs are woven in a large number of villages lo-

cated in an area of Western Iran known as Chahar Mahal and Bakhtiari (Zagros Mountains of Iran). They are woven by Bakhtari tribes and nomads of the area, and the oldest rugs are some 200 years old. It must be noted that the weavers of Bakhtiari oriental rugs are typically not from Bakhtiari tribes, but rather they are from a number of tribes under the rule of Bakhtiaris. The rugs coming from this region are all referred to as Bakhtiari rugs. The rugs produced by these formerly nomadic tribes share common designs, structures, and color palettes (Nassir 2010). Bakhtiari Persian rugs were first introduced to the west in the 19th century. This corresponded with the demand of Persian rugs by European, American, and Japanese households (Ghazizadeh-Tehrani 1976). The combination of the nomadic tribal design containing abstract geometric motifs symbolizing the Persian garden (Talebian 2010), and the urban village design of classical sophisticated Persian motifs makes the Bakhtiari rug a unique Persian oriental rug.

Simplicity is another feature of Bakhtiari carpet. These designs contain repeated bricks and rhombuses and include a number of flowers and trees in their design (Fig.3).

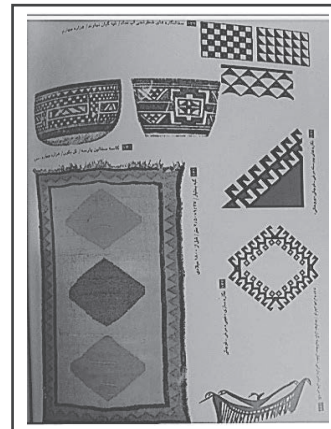


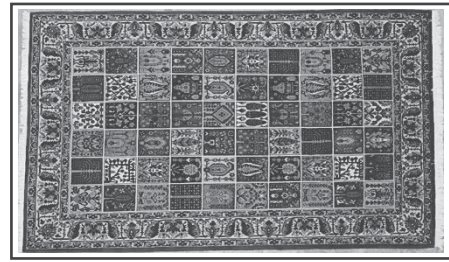
Figure 3. Bakhtiari Gabbeh (Tanavoli 2004)

Bakhtiari rugs can be readily identified by their typical repeated rectilinear floral or garden-inspired patterns (Jouleh 2002). Of these, perhaps the most well-known of the Bakhtiari rug designs is the "Kheshti" (Fig.4-a). In this pattern the rug field is geometrically sub-divided into symmetrical squares or rectangles that feature contrasting imagery and color schemes (each compartment elegantly rendered with finely detailed portrayals of both animals and plant life)

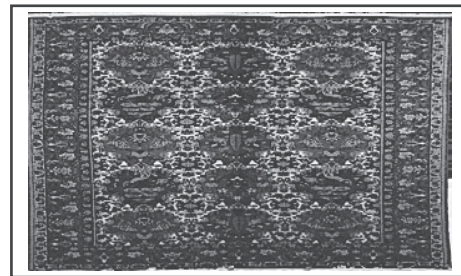
(Fig.4-a). In another Bakhtiari notable design, the “Garden panel”, the motifs include trees such as the willow and cypress trees, as well as grapevines, and nature scenes (Fig. 4-b). The “Tree of Life” design is based on tree branches and leaves. In this type of design, shrubs and trees (small and large) form the main components and a number of attempts has been made to maintain a high level of similarity with nature (Fig. 4-c). The “Gol Patoo/floral bouquet” design of this type is only created by women weavers and mind maps of these weavers (Fig. 4-d). This design shows the role of a rose flower with its surrounding leaves. The uses of these designs by Iranian artists, such as Chaharmahal and Bakhtiari carpenters, have no limits. They sometimes only put the flower in a mantle, and by repeating the frames, they built a masonry map and called it a mirror frame. Sometimes they put some of these flowers in the middle of the carpet instead of the medallion, and it is called the bergamot flower grass. The same method in ceiling paintings can be seen in that the role of the blanket has been used in different ways. The “Bibibaff Bakhtiari” rugs with the highest knot density are often known as Bibibaff, and they are very special and hard to find. An old dealer story reveals that Bibi means Grandmother and Baff means knot, so a Bibibaff is a rug made by old grandmothers who were the best weavers (Bakhtiari 2006; Fig. 4-e). The “Mina flower” pattern is comprised of repeated daisies inter-linked by diamonds (often curved) or circular lines (Fig. 4-f).

Persian/Iranian rugs, particularly the Bakhtiari rug in this research, shows different designs. This rug is in many respects similar to music in terms of its rhythm, distance, color, repetition, and symmetry. Morton Feldman (1926-1987) is one of the contemporary composers who worked in this field, and he was also a rugs collector. He liked the features of rugs and studied about them. Feldman's late music - or 'Permission' for it, in his own words - came from Oriental rugs, which he collected (Griffiths 2010: 280). ‘A growing interest in near and middle eastern rugs has made me question notions I previously held on what is symmetrical and what is not’ (Feldman 1983:124). He believed that music and the designs or a repeated pattern in a rug have much in common (Feldman 1983:124) (Figs. 5-c, 5-e). On the other hand, weaving of Bakhtiari rugs is based on the mind maps of weavers, and are improvised by weavers which might be close to Feldman’s approach in that he had links to the Oriental rug patterns in his

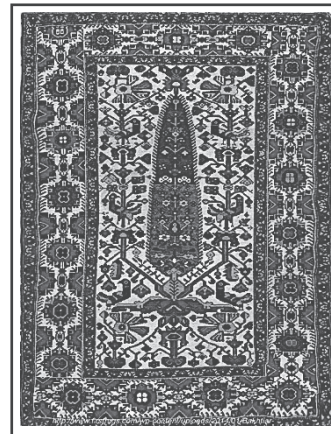
**a) Kheshti.** Bakhtiari kheshti (brick) design with its houses decorated with plants and animal. A special design, which is exclusively used for knitting in the area of Chahar Mahal and Bakhtiari.



**b) Garden panel.** A plan similar to kheshti design focusing on plant designs and nature and vegetation of the region.



**c) Tree of Life.** The design is based on branches and leaves. Small and large trees and shrubs, especially in individual forms create the main components of the most designs of this group and are combined with other component.



**d) Gol patoo (floral bouquet).** The blanket design shows the role of a rose or rose flower with its surrounding leaves.

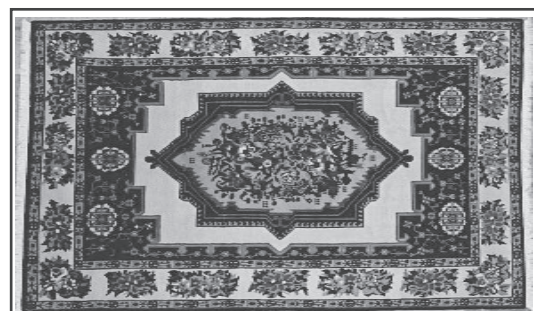


Figure 4 (a-d). Major designs of Bakhtiari rug (Jouleh 2002). a) Kheshti, b) Garden panel, c) Tree of Life, d) Gol patoo (floral bouquet) (Jouleh 2002). Rug photos from Forugh Esmacili.

e) **Bibibaff.** The pattern has the highest knot density.



f) **Mina flower.** The pattern is made up of repeated daisies interlinked by diamond (often curved) or circular lines.



Figure 4 (e-f). Major designs of Bakhtiari rug (Jouleh 2002). e) Bibibaff, f) Mina flower (Jouleh 2002). Rug photos from Forugh Esmacili.

scores. We therefore examine this relationship between elements (color, texture, form) and the principles (repetition, rhythm, and time) in Persian Bakhtiari rugs and the contemporary composer Morton Feldman's musical works in the next section.

### 3. The relationship between Persian Bakhtiari rug design and music elements

Are the elements and principles in music (repetition, rhythm, and time) related to the same elements and principles in weaving Persian rug design? Repetition is an important element in musical composition and is created by the repeating

of various musical ideas or motifs. In music, repetition is often related to rhythm. Rhythm is comprised of regular intervals of long and short notes. This arrangement of notes flowing up and down the scale provides movement as it progresses across the score (Anvari 2014).

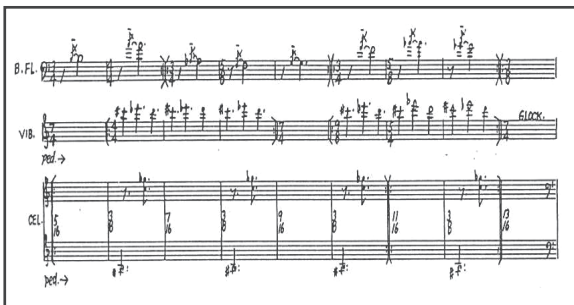
Repetition and rhythm in weaving are a combination of different elements. The repetition and rhythm in this body of work are achieved using patterns in the weave structure, colors and motifs as they move across the rug. The weavers of Persian rug, with their inventive minds, selected shapes and elements which were considered holy or valuable and illustrated them in a stylized and completely symmetrical way on the rug.

Symmetry and repetition are both basic features of a rug as can be seen in the Bakhtiari rug. For example, the Bakhtiari Kheshti design is like that of a square chess board, in which the rug is divided into four quadrants (squares) which are equally divided and have a similar pattern. These squares are also woven into intermediate rows for mirroring and reflection of the patterns and colors across both the horizontal and vertical axes (Fig. 4-a). In fact, symmetry is the main tool to establish different scales in a design by using very limited elements. Symmetry creates different relationships between simple elements in order to build new motifs on a different scale. Then these new motifs will again be subjected to new symmetrical strategies to form bigger sections of a design up to the overall structure of a rug (Anvari 2014). One very intriguing fact of this procedure is using one simple element and structuring new identities out of it, while all these new figures are interconnected to the initial basic motif. This fact brings a strong coherence to the whole structure of a design.

On the other hand, one of the prominent features of a rug is its simultaneous symmetry and asymmetry. This phenomenon is referred to as "crippled symmetry" by Morton Feldman (1983). An analogy can be seen between the method Feldman combines with different musical patterns and the combination of patterns in a rug. For example, three different patterns are used together in crippled symmetry (Fig. 5-a). The vibraphone is relatively active and consists of quarter notes, dotted quarter notes, and half notes. The flute is less active compared to the vibraphone (VIB) with half notes, and the dotted quarter notes on CEL (Celesta) are the slowest ones. In fact, there are different patterns with different rates of repetition, and these

can be compared to an example of the border of a rug (Fig. 5-e). We have smaller elements with higher and bigger elements with a slower rate of repetition. In Figure 5-b, repetition can be seen in B.FL (Flute Bass) (D-flat, E-flat, A-flat, B-flat), Glock (Glockenspiel) (C-sharp, D-sharp, A-sharp, B-sharp), and PF (Piano acronym) (A-sharp, G-sharp, D-sharp, C-sharp), and in Figure 5-d between D flat, E, F, G flat (four sixteenth note; sixteenth note is one of the musical notes) and mirroring in Figure 5-b between Glock and B. FL and in Figure 5-d between D flat, E, F, G flat (four sixteenth note) in the horizontal axes. Figure 5-e shows repetition and symmetry and patterns on the border of a rug. A symmetrical effect of the second palindrome is observed in Figure 5-c. The groups of two small rectangles disrupt the symmetrical pattern of the rug (Figure 5-c). The two palindromes are similar to each other. In each, the pitch material, as well as the level of repetition, gradually increases toward the middle of the palindrome, and then decreases to the end of the palindrome. Further, the pitch material itself is essentially the same between the two palindromes.

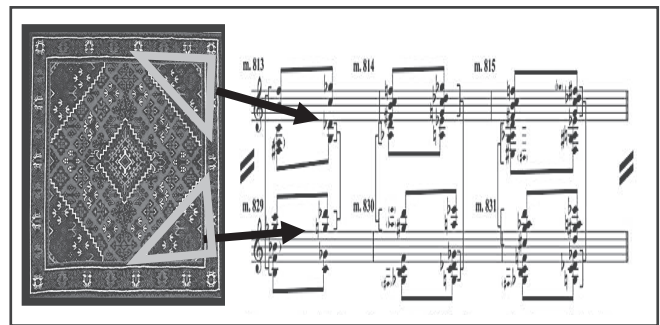
a) Combination of three different patterns (*Crippled symmetry*, Feldman 1983).



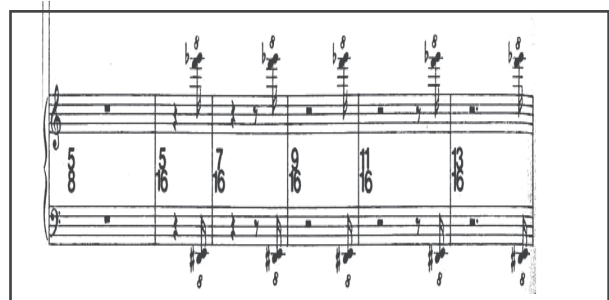
b) Repetition and Mirroring (between B.F.L, Glock and PF) (*Crippled symmetry*, Feldman 1983).



c) Symmetry in Bakhtiari rug and Feldman composition. Arrow keys indicate symmetry and repetition in rug and composition.



d) *Spring of Chosroes*, Feldman 1977 (mirroring the horizontal axes and repetition)



e) Repetition in Feldman composition (B.F.L, Glock and PF) and Bakhtiari rug. Arrow keys indicate repetition in rug and composition.

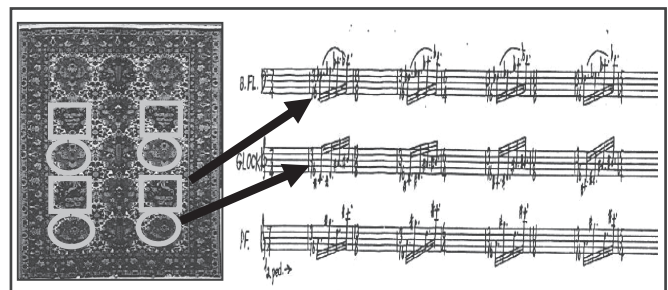


Figure 5 (a-e). Patterns in Musical composition of Feldman and Bakhtiari Persian rugs. B.F.L. (Flute Bass), Glock (Glockenspiel), and PF (Piano acronym), and Vib (Vibraphone). Rug photos from Forugh Esmacili.

Another relationship to the rugs is the way in which Feldman made his sketches; he often started his sketches from the bottom of the page, working his way up to the top of the page. This is intriguing because the Persian rugs were most likely woven on vertical looms, on which the rug is woven from the bottom to the top (Wilhoite 2004, Fig. 6).

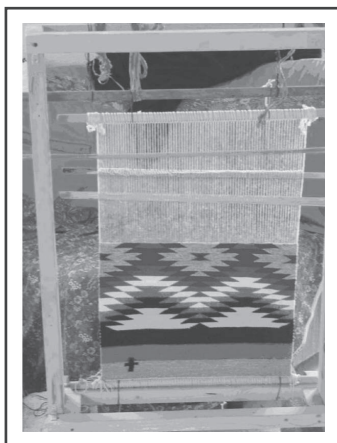


Figure 6. Example of a rug being woven on a vertical loom. (Wilhoite, 2004).

#### 4. Discussion and Conclusion

The purpose of this research has been to explore the repetition, rhythm, and symmetry in music compared to that of Persian rugs, and also to acquire a deeper understanding of Persian rug weaving and Feldman compositional methods and how each are interrelated. We observed a close relationship between the music approach of Feldman and the weaving of Bakhtiari rugs in terms of elements such as rhythm, pattern, repetition and symmetry.

In Feldman's music approach and Persian rug design, balance and symmetry result from the repetition of musical and visual motifs. When viewing a Bakhtiari rug, the eye immediately recognizes the same figures, lines, and colors repeated and reflected; the left side repeats the right, and the upper part mirrors the lower. The same symmetry seems to define the form of every small motif, pattern and element of the rug, each element having its own 'tonal' center and cadence. The repetitions in Feldman's works are rarely exact, using inflections in rhythm, register, and timbre to create a subtle transformation of timbre and harmony over the duration of the piece as a whole.

Goldstein (1999) found that Feldman 'often arranges sound so that repetitions are recognizable as repetitions, but the patterns of those repetitions are not discernible'. (Goldstein 1999; Wilhoite 2004). Feldman's transformation process relies on a more intuitive/creative approach when transforming textile patterns into sound. In Persian rug design, harmony is balance among colors. The rug is a set of muteness and silence. We can conclude that compositions based on the rug involve the conceptual relationship between the set of sounds, with its frequency and specific features and a collection of materials and colors which are designed together. The relationship between rug design and music is like a cross-disciplinary connection between muteness (rug) and silent/and non-consonant (music) arts.

Examining Feldman's sketches through the lens of rugs allows us to parse these pieces of music in a way that taps into the composer's organizational process. The American composer, Morton Feldman interpreted traditional rug design elements (mainly symmetry and repetition) in terms of Western contemporary musical notes. In other words, Feldman connects Eastern and Western, as well as tradition and modernity in his improvisation approach. Further analysis on these lines will help to reveal further organizational principles behind the improvisation approach in music, weaving rugs and design.

#### Acknowledgements

The author would like to thank Ms. Forugh Esmacili, Ministry of Industry, Mine, Trade, Iran for valuable and technical support regarding Persian rugs and the photos. We also thank two anonymous reviewers and the Editor-in-Chief for their careful reading of our manuscript and many insightful comments and suggestions.

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