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TYPOLOGICAL CLASSIFICATIONS OF GREEK DANCE FORMS ACCORDING TO THE TYPE OF CHOROS "STA TRIA": A NON-PARAMETRIC AND NON-LINEAR CANONICAL CORRELATION ANALYSIS OF 122 GREEK FOLK DANCES

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Abstract: In the study and teaching of folk dance the determination of the syntactical rules that shape the interdependence between the structural elements of dance and music remains a major topic of interscientific interest. Therefore, the aim of the present research was the multivariate categorical analysis of Greek folk dances according to their resemblance in structure and form to the type of a widespread Greek folk dance "choros sta tria." The multivariate analysis was conducted on the qualitative findings of Tyrovola's study (1994) which with the use of the structural-morphological method for the analysis of dance: a) documented the structural type of "choros sta tria," b) showed its homogeneity with 132 Greek folk dances and c) proposed four taxonomic categories of dance form for their classification. 122 dances of Tyrovola's research were used in the present study and were categorized according to two independent variables (factors): a) category of dance form (*identical, heteromorphic, varied,* and r*emodeled-related* dance forms), and b) geographic area (*terrestrial* and *insular* areas of the country). Nine distinct and variant properties of the dance form of "choros sta tria" were used as dependent variables: music meter, tempo, dynamics, dance handhold, dance formation, number and kind of kinetic elements of the 2nd part of the semifinal and final kinetic dance motifs, model of dance form. The correlational structure of the nine dance properties and the two factors were tested by a series of chi square (χ^2) analyses (nonparametric univariate approach) and non-linear canonical correlation analyses (multivariate approach). The results of these analyses indicated that there is a significant difference between the *terrestrial* and *insular* distribution of Greek dances across the four levels of *dance form.* The geographical differentiation of the dances in terrestrial or insular was mainly based on the properties of *metro, tempo, dynamics,* and *dance formation,* while the morphological differentiation in *identical*, *heteromorphic*, v*aried*, *remodeled-related* dance forms was based on the interaction between the elements of their rhythmical organization and the variations of their basic structural type. The application of these statistical methods of analysis in the study of structure and style of Greek folk dances proved to be very efficient in unveiling critical aspects of their multivariate domain. The morphological method of dance analysis combined with statistical methods may enhance research in this area, enriching thus already documented findings regarding the substantial dimensions of this multifactorial phenomenon.

Keywords: Greek folk dance, typological classification, categorical canonical correlation analysis

INTRODUCTION

Dance is an expressive medium for revealing the social and cultural characteristics of the society it belongs. It takes part in the institution of individual, group, and national identity laws and it contributes to the cultivation and conservation of wider social and interpersonal relationships (Dania et al. 2009). Up to nowadays, according to Greek and international literature, dance is defined as a notional, symbolic, aesthetic, socially determined, and codified meaningful act, which is expressed through the motor and symbolic activity of the body (Tyrovola 1994, 2001). It is a composite form of human energy and behavior which is expressed through the various combinations of the time-space schemas, and represents an integral part of the overall structure of the cultural-communicatory system (Dania et al. 2009). However, dance is primarily form, materialized image, observable result of the structural rules of its morpho-syntactic elements and properties, the combination of which specifies its discernible differences in relation to other forms of movement that are met in various, everyday or not, human movement activities.

Under these terms, a dance, and particularly a dance choreography, is not a simple combination of component elements. On the contrary, it is a structured unity that owes its form and importance to the coherence and interrelationships between its component parts and elements (Tyrovola 1994, 2001; Dania et al. 2009). According to Giurchescu – Kroslova (2007) "...dance form is the result of an active process during which smaller unities with a particular structure and shape, act as parts of bigger structural unities…" (p. 23). The use of structural and morphological criteria in the study of dance form was brought forward by the morphological method for the analysis of dance, which was a scientific approach that expounded in Eastern Europe. According to this method, the determination of a given dance form comes as a result of its structural analysis during which it is possible to track down the basic syntax rules of the form's inner elements (Giurchescu – Kroslova 2007) in relation to the levels of the musical accompaniment. The stage by stage study of the structural levels of dance form (kinetic elements, cells, kinetic motifs, dance phrases, dance segments, dance parts, dance choreography) in relation to the musical structure and rhythm contributes to the determination of certain syntax rules, providing in this way a "grammar syllabus" for dance suitable for further comparative analyses.

In Greece, Tyrovola (1994) used the morphological method under a structural perspective in order to document the structural type of a widespread Greek folk dance called "choros sta tria" and subsequently show its homogeneity in a large number of Greek folk dances. "Choros sta tria"[1] is a very popular dance in Greece appearing with either: a) the same name, or b) a different name or c) a similar dance form in the musical-dance repertory of the residents of Greece and in many of the country's customs and festivals. Tyrovola chose randomly nine different melodies of "choros sta tria" from different areas of Greece and analyzed morphologically the form of the respective dances. The analysis was carried out with the combinational use of the following methods:

[1] The term "choros" in Greek means dance and the term "sta tria" refers to the three meter rhythmical and kinetic schema of the particular dance.

1. The morphological method for the analysis of dance proposed by G. Martin and E. Pessovar (1961, 1963).
2. The I.F.M.C. (1974) structural model of dance form analysis.
3. The four-stage methodological model for the analysis of dance form suggested by Adshead Hodgens, Bringshaw, & Huxley (1988).

Table 1. Morphic type of "choros sta tria" (variant and invariant properties)

<table>
<tr><th colspan="6">"choros sta tria" dance</th></tr>
<tr><td>ΟΦ or
ΠΦ</td><td>F·3</td><td>2/4 or 4/4 or 6/8
(1+1)/ (2+2)/ (3+3)</td><td rowspan="4">$\delta + \alpha$
→ ↱</td><td rowspan="4">$\underset{\rightleftarrows}{\delta}$ $\begin{cases} \alpha_1 \\ \alpha_2 \\ [\alpha(\delta)x - \delta] \\ \alpha_7 \\ \alpha_{10} \end{cases}$</td><td rowspan="4">$\underset{\rightleftarrows}{\alpha_o}$ $\begin{cases} \delta_1 \\ \delta_2 \\ \delta_3 \\ [x(\alpha_o)\delta_o - \alpha_o) \\ \delta_6 \\ \delta_7 \\ \delta_{10} \end{cases}$</td></tr>
<tr><td></td><td>Fo/MF</td><td>♩~ 75-108</td></tr>
<tr><td>Im. / Ir</td><td>↺</td><td>M / W</td></tr>
<tr><td>(Α+Γ) /
(Γ) / $A_Γ$ /
$Γ_A$ /A</td><td>Οχ.</td><td>Κχ.</td></tr>
</table>

The morpho-syntactic and morpho-structural properties of the nine dances were notated, described, classified, and analyzed in relation to the parameters of time and space, until a codified typology of each dance choreography was achieved (morphic type[2]). The comparison of these morphic types brought forward the existence of invariant and variant structural properties of the dance's form. The invariant properties were those that determined the structural type of "choros sta tria" (kinetic type)[3] *(Table 1),* on the basis of which its definition was given. Particularly, the dance "choros sta tria" is the three meter rhythmical and kinetic dance unity (dance phrase), which is structured (on the basis of the strong parts of the three rhythmic motifs) according to the triple, isometric and isorhythmic succession of the support indexes. This succession is stable and prevalent in the first part of the first, second and third kinetic motif, appearing with the structural relation "right foot to the right, right foot to the right, left foot to the left." These properties together with the particular use of space (linear open circular process to the right) and the slow and stable tempo are the invariant characteristics of the dance form which constitute the structure of "choros sta tria" (Tyrovola 1994). Furthermore, apart from these invariant properties, many different patterns of relationships between eleven pairs of certain ending kinetic motifs (second and third kinetic motif) were detected. These patterns together with morpho-syntactic elements like the rhythmical schema of the dance music,

[2] The codified form of the inner relationships between the particular characteristics and properties of dance form in the time–space sequence (Tyrovola 1994, 2001).

[3] The type of dance structure which defines exactly the development of dance movements in time and space. It refers to the duration of the supports of the legs that take place in every kinetic motif and also to the repetitions of the same supports or their changes during one dance phrase, which is the simplest organic compositional unit of the dance, which demonstrates the fundamental content and form of the dance idea (Tyrovola 1994, 2001).

the dancers' sex and formation, the dance handhold, the model of dance form, seemed to vary across the nine dance forms without, however, changing the basic structure of the dance. These elements were noted as the variant properties of the dance form and could thus function as the morpho-syntactic stylish elements of "choros sta tria."

On the basis of the aforementioned findings, Tyrovola chose 132 folk dances from different areas of Greece and studied, analyzed and compared their morpho-syntactic and morpho-structural composite elements (movements, elements of space, rhythmical schema and organization, sex and formation of the dancers, kinetic elements of the ending kinetic motifs, dance parts, dance phrases) with the respective elements of the dance "choros sta tria." For a more thorough analysis of their dance forms, these dances were first classified according to the rules of form composition and particularly according to the rules of a) the linking principle and b) the grouping principle (I.F.M.C., 1974). The typological classification of the 132 dances' form (structural type, morphic type, kinetic type) and their subsequent comparison with the type of "choros sta tria" proved that regardless of the degree of their semantic relationship with "choros sta tria," all these dances were structured according to the same three part schema responding to the same invariant relationships-characteristics. There seemed to be a central dance core which remained stable (the three part schema that constituted the basic structural type of "choros sta tria"), while all the other elements of dance form changed continuously, as the dance was spreading from place to place, from race to race. The analysis confirmed that all these dances were homeotypic (structured according to the type of "choros sta tria") and thus could be characterized as dances with the type "sta tria" (Tyrovola 1994, 2001, 2010).

Taking as a reference the properties of "choros sta tria" (variant and invariant) as well as its typology, Tyrovola's study proposed four categories for the taxonomy of the dance form (proportionate to the typological distinctions of the dances' kinetic and morphic types), which were ranked from the most to the least proximate to the specific genre typological-structural category/form of "choros sta tria." These categories were: (a) *Identical* dance forms, characterized by isochronous movements and same kinetic and morphic type with the dance "choros sta tria," without any variance in the basic syntactic elements of form; (b) *Heteromorphic* dance forms, characterized by isochronous movements, common syntagmatic structure and (i) common kinetic type but different in some of their form elements, or (ii) different morphic type (as far as the kinetic elements of the ending kinetic motifs were concerned) without any change in other form elements, or (iii) different kinetic type (as far as the kinetic elements of the ending kinetic motifs were concerned) with changes in some of the form elements like handhold, dancers' sex, dance formation; (c) *Varied* dance forms, characterized by isochronous movements but also by expansions of the basic form with sectional kinetic motifs (syntagmata); (d) *Remodeled-Related* dance forms, characterized by non-isochronous movements but with meaning and syntactic similarities and possibly common syntagmatic structure. Their relationship is restricted in some common components of the syntagmatic axis, such as the use of the rhythmic three-part meter or the existence of common cells,[4] which are their points of

[4] The rhythmically and dynamically organized kinetic elements of a dance movement (Giurchescu – Kroslova 2007).

relation with the kinetic and morphic types of the identical or heteromorphic dance forms. Tables of morphological analyses of dances representative of each of the four taxonomic categories (together with the translation of the used abbreviations and symbols) can be found in *Appendix 1.* These four categories were proposed by Tyrovola as a point of reference for the classification of a given dance form according to its affinity to "choros sta tria," providing thus a valuable theoretical and methodological tool suitable for further analyses in the study and teaching of Greek folk dance.

Considering that the application and use of certain classification rules makes the study and teaching of Greek folk dance a substantially less arduous process, the same sample of the 132 Greek folk dances is used in the present study in order to establish with a statistical method the variability of the Greek dance form properties. The objective of the quantitative management of the already qualitatively handled research data is to prove that the combination of the structural-morphological method of dance form analysis with multivariate statistical methods may enrich already documented findings and thus enhance research in the area of studying and teaching of Greek folk dance. Particularly, the primary aim of the present research is to compare statistically the four proposed taxonomic categories on the basis of the variant properties of "choros sta tria" (the number and kind of kinetic elements of the two ending kinetic motifs, the rhythmical schema of the dance music, the dancers' sex and formation, the dance handhold, the model of dance form), in order to establish that these categories are truly different. Furthermore, considering that the dance sample comes from ethnographic research in almost 100% of the Greek dance domain, a second aim of the present research is the application of an extra comparison between the dance forms of the terrestrial and insular areas of Greece, in order to examine the impact of a dance's geographic origin on the determination of its form. Keeping in mind though that research variables are more meaningful taken together than considered separately in a level by level analysis (Meyers et al. 2006), the authors inferred that the application of a robust multivariate statistical technique would be the most appropriate method for a thorough analysis of the particular sample. A basic advantage of the multivariate statistical methods is that they can deal with the associations between composite sets of multiple dependent and independent research variables in order to quantify the strength of their relationship. Based on the above theoretical considerations it was hypothesized that, within the limitations of the present sample of dances, there should be statistically significant differences: (a) between *terrestrial* and *insular* Greece folk dances in terms of their morpho-syntactic and morpho-structural composite elements, (b) between the *proposed taxonomic categories of identical*, *heteromorphic*, *varied*, and *remodeled-related* dance forms in terms of the variant properties of "choros sta tria," and (c) between the *terrestrial* and *insular* distribution of the Greek dances across the four taxonomic categories of *dance form.*

METHOD

Sample

The initial sample of Tyrovola's research (1994) consisted of the 235 Greek folk dances. The aim was to cover all Greek geographical regions, including areas that were populated by refugees of Asia Minor, Black Sea, Eastern Thrace and Cappadocia. However, Tyrovola analyzed 132 dances of the initial sample as being more representative according to certain criteria. In particular, these dances were preferred more by the residents of the local communities, they had a primary role at their customary events, and they were widespread in Greece. In the present study a total of 122 dances were kept for further analysis; ten of the 132 dances were further excluded as adversative in the use of space (a fact that would complicate the analyses).

Independent and Dependent Variables

The 122 dances were categorized by form and geographic area. These two criteria constituted the *categorical independent variables* (factors) of the study. Dances were categorized according to:

1. Four dance forms as
   i. identical dance forms (33 dances),
   ii heteromorphic dance forms (42 dances),
   iii varied dance forms (25 dances) and
   iv remodeled-related dance forms (22 dances).
2. Two geographic areas as
   i terrestrial areas (69 dances) and
   ii insular areas (53 dances).

Nine (9) distinct properties of the dance form (variant form properties of the dance "choros sta tria") were used as dependent variables (DVs). These properties were (1) music meter (metro), (2) tempo (tempo), (3) dynamics (dynamiki), (4) dance handhold (lavi), (5) dance formation (diataksi), (6) number of kinetic elements of the 2nd part of the semifinal and final kinetic dance motifs (kinkatmo), (7) kind of the kinetic elements of the 2nd part of the semifinal dance motif (kinbmot), (8) kind of the kinetic elements of the 2nd part of the final dance motif (kincmot), (9) model of dance form (forma). These elements were firstly proposed by Martin – Pessovar (1961, 1963) and the I.F.M.C. Study Group (1974) as factors that concern the relationship between dance and music and thus play an important role in the sectioning of folk dance. Since then some researchers adopted them with changes and/or expansions (Tyrovola 1994; Koutsouba 2007), while others proposed their own taxonomies that take these elements into account (Adshead et al. 1988). Each variable's discrete levels were transformed into ordered categories (grades) so as to be appropriate for statistical analyses (categorical variables). Their definitions, selection criteria and grading scales are given in *Table 2.*

Data analysis

The correlational structure of the 9 dance properties and the two factors (dance form, area) were tested by two complementary statistical approaches. Initially a series of chi square (χ^2) analyses were carried out to examine the non-parametric relationships between each factor and each dance property. The chi-square statistic is a nonparametric technique used to test a) whether a distribution of observed frequencies in a cross-tabulation of two categorical variables differs from that of theoretically expected frequencies, and b) whether these variables are statistically independent (COHEN 1992). The distribution of the observed vs. expected frequencies in contingency tables is one of the most commonly used analytical methods in the social sciences, when the researcher deals with the association between categorical variables (TABACHNICK – FIDELL 2007: 58–59).

The two sets of variables (two factors, nine dance properties) were then subjected to canonical correlation analysis for categorical data (multivariate approach). The analysis was carried out by the "optimal scaling" method of the dimension reduction tool of SPSS18. Optimal scaling "quantifies" each categorical variable such that the association of each set of variables to a set of hypothetical object scores be maximized (BURG – LEEUW 1983). This corresponds to categorical canonical correlation and, instead of correlating the two linear canonical variates (sets of variables), these two sets of variables are compared to an optimally defined set of object scores (MEULMAN – HEISER 2007: 40–45). With the use of this method problems that arise with the quantitative handling of categorical data (i.e. less powerful or effective statistical tests or tests difficult to implement and interpret definitively) are circumvented and categorical variables are more amenable to analysis (MOSS 2008). This method has been successfully used so far to discover similarities among sets of discrete variables in scientific areas such as trip chaining behaviur (GOLOB 1986), policy in trip priorities (HENSHER – GOLOB 1999), climatic variability (HSIEH 2001), social style and health (FRIE – JANSSEN 2009), and medical research (YAZICI et al. 2010).

RESULTS

Descriptive profile of the Greek dance properties

The 122 Greek dances that were analyzed in the present research covered the vast majority of the Greek geographical regions *(Table 3).* In particular, the sample consisted of dances from the following regions: Epirus, Attica, Thessaly, Roumeli, Central and Western Macedonia, Thrace, Crete, Black Sea, Eastern Thrace, Eastern Rumelia, Cappadocia, Dodekanese, Cyclades, Sporades, islands of the Eastern Aegean Sea and Thracic Sea, Evia, Eptanese and Cyprus. The name of each dance together with its musical meter and the geographic area that it came from are shown in *Table 3.* Most of these dances were rhythmically organized by a 2-count or a 4-count meter, which are characterized as simple musical meters. Composite musical meters – which may be conjunctions of two or three part meters – were mainly observed in the regions of Central and Western Macedonia.

Table 2. Definitions, selection criteria and grading scales of the 9 dance properties (dependent variables, N = 122)

Dep. Variable (abbrev.)	*Selection Criteria*	*Category (Grade)*
Meter of the dance music *(metro)*	One of the four important and indispensable co-ordinates for the recognition of the temporal relationships of the music-dance rhythm	12 categories (ordinal): 2/2 (1), 2/4 (2), 4/4 (3), 4/8 (4), 5/4 (5), 5/8 (6), 6/8 (7), 6/4 (8), 7/8 (9), 7/16 (10), 11/8 (11), 11/16 (12)
Music tempo (beats / minute) *(tempo)*	The speed of the basic rhythmic unit of the music in relation to the movement	7 categories (ordinal): 40–59 (b/min) (1), 60–65 (2), 66–75 (3), 76–105 (4), 106–120 (5), 121–160 (6) , 161+ (7)
Dynamics *(dynam)*	The degree of tension / relaxation, speed / suddenness, resting / development, lightness / heaviness of dance movement	5 categories (nominal): P (1), PM (2), Fo (3), MF (4), FF (5)
Dance handhold *(lavi)*	The way that the dancers hold hands. An index of the dance vocabulary of the community	5 categories (nominal): T = the arms around the shoulders (1), W = from the hands with bending elbows (2), X = with arms crossing each other (3), M = from the hands without bending elbows (4), Σ = arm-in-arm (5)
Dance formation *(diataksi)*	The way that the dancers are arranged in dance according to their sex. An index of the dance vocabulary of the community	8 categories (nominal): A = only men (1), Γ = only women (2), AΓ = mixed: men and women (3), A–Γ = men in front and women follow (4), A_{Γ} = men in an outer circle and women in an inner circle (5), Γ_{A} = women in an outer circle and men in an inner circle (6), AΓΓA = men at the sides and women in the middle (7), ΓAΓ = women in the front and at the back and men in between (8)

Number of kinetic elements #1 *(kinkatmo)*	Variant properties of the form of the dance "choros sta tria" that are directly related with the characteristics of each case local movement tradition	4 categories (ordinal): 1, 2, 3, 4 elements
Kind of kinetic elements #1 *(kinbmot)*		6 categories (nominal): Leg support on the spot (1), step (2), leg gesture (3), projection on the toes (4), one leg crosses over the other (5), step/bounce of the whole foot or a part of it (6)
Kind of kinetic elements #2 *(kincmot)*		
Model of dance form #3 *(forma)*	The determination of dance form serves first as an index of the local dance characteristics and second as a basic morphological criterion for the determination of dance structure	7 categories (nominal): ΑΟΦ = homogeneous chain form (1), ΑΒΟΦ = two-segment homogeneous chain form (2), ΑΒΓΟΦ = three segment homogeneous chain form (3), ΑΒΠΦ = two segment variation form (4), ΑΒΓΠΦ = three segment variation form (5), ΑΒΕΦ = two segment heterogeneous form (6), ΑΠΦ = variation chain form (7)

#1 : 2nd part of the semifinal and final kinetic dance motifs;
#2 : 2nd part of the final dance motif;
#3 : Inner composition of the dance motifs, the dance phrases, the dance segments or parts as well as their in-between relationships.

Table 3. Qualitative profile of the Greek dances

Region	*2c/nt meters*	*4c/nt meters*	*5c/nt meters*	*6c/nt meters*	*7c/nt meters*	*11c/nt meters*
Epirus	Menousis	Deropolitisa, Xenitemoeno mou pouli, Mia panagia peratiani, Dimos, Diplos choros		Sti vrisi sta tseritsena		
Attica	Manoleiko, Loulouvikos	Trata (1st part), Trata (2nd part)				
Thessaly	Diosmos kai Vasilikos, Tis Alaxandras to vouno, Malamo	Diosmos kai Vasilikos, Pera ston pera Machala, Karagouna, Dimos, Svarniara, Tai-tai (2nd part), Giouria sta paliouria		Pos pianete i agapi		
Roumeli		Maro, Katakampi papadoula mou		Helidonaki mou gorgo		
Central/Western Macedonia	Stamoulo, Diplos choros, Partalos (2nd part), Chasapia (2nd part)	Svarniara, Tkfeskino, Gainta (3rd part), Anixe Eleni tin porta (2nd part), Dimos, Enas kontos kontoutsikos	Diamanto	Tou Tsianou, Pote tha erthi i anixi, Ai more chara, Ivana (2nd part), Ston Isvoron anevenan	Eleni kopela, Zervos Imathia, Raiko Edessa	Galazios petinos, Stangena, Marena, Patrounino
Thrace	Hasapiko, Zervos (2nd part)			Zonaradikos, Soultana, Kouseftos, Zonaradikos Metaxades		
Crete	Siganos, Katsibadianos				Agaliastos	
Black Sea	Kotsari, Omal Kars, Kots		Tik mono			
Eastern Rumelia	Kastrinos				Bogdanos	
Asia Minor, Cappadocia	Hasapikos, (1st & 2nd part), Hasapia, Choros tis Savitsas (1st part), Strogylos choros, Makroulos choros					

Dodekanese	Pera stous pera campous, Pera ston pera campo, Issos Kalymnos, Issos Kos, Sirba (2nd part), Sousta (2nd part) Pano choros, Sousta Symis, Kato choros (1st part), Sousta Kassos, Choros of the married couple Rhodes	Rinaki (3rd part), Tzeneveto Rhodes, Issos Leros				
Cyclades	Ageranos Paros, Blaristos Myconos (2nd part), Vlacha Naxos (1st part) Vlacha Naxos (2nd part), Perioli Nysiros, Empros Nysiros					
Islands of Eastern & Northern Aegean and Thracic Sea	Ola ta poulakia, Syrtos Samou, Strose vagia kai louloudia (2nd part), Strose vagia kai louloudia (3nd part), Sousta Samou, Patima, Ikariotikos (1st part), Ikariotikos (2nd part), Detos, Panagia choros, Sibethercatos, Siganos Patmos	Orkos Thasos, Stavrotos wedding dance				
Evia, Sporades	Choros tis tratas, Mermigas, Choros tou pascha	Tounte-tounte (1st part), Kales Skyros				
Eptanese	Milia (2nd part), Bourdaris (2nd part), Mermigas, Ai Giorgis Kithira (1st & 2nd part), Kinigos Zakynthos	Ai Giorgis Corfu				
Cyprous	Sousta					

Table 4. Cross tabulation of Geographic Area and Dance Form (N = 122)

Geographic Area	*Dance Form*				Total
	Identical	*Heteromorphic*	*Varied*	*Remodelled*	
Terrestrial	25	11	16	17	69
Insular	8	31	9	5	53
Total	33	42	25	22	122

$\chi^2 = 25.121, df = 3, C = 0.413, p = .000.$

Non parametric correlations between the 9 dance properties, geographic area and dance form

From the results of the cross tabulation for *Geographic Area* and *Dance Form* it becomes clear that the two independent variables are correlated significantly (contingency coefficient $C = 0.43$, $p = .000$). This finding indicates that *there is a significant difference between the terrestrial and insular distribution of dances across the four levels of Dance Form (Table 4).*

The results of the chi-square analysis for the relationship between the two factors and the 9 dance properties are given in *Table 5.* According to these results (a) *Geographic Area* correlates significantly with *metro* ($C = .485$, p = .000), *dance handhold* (lavi) ($C = .430$, $p = .000$) and *dance formation* (diataksi) ($C = .565$, $p = .000$), while (b) *Dance Form* correlates significantly with *metro* ($C = .587$, $p = .000$), *dynamics* (dynamiki) ($C = .444$, $p = .003$), *dance formation* (diataksi) ($C = .626$, $p = .000$), *kinkatmo* (number of kinetic elements of the 2nd part of the semifinal and final kinetic dance motifs) ($C = .424$, $p = .002$), *kinbmot* (kind of kinetic elements of the 2nd part of the semifinal and final kinetic dance motifs) ($C = .537$, $p = .000$), and *kincmot* (kind of kinetic elements of the 2nd part of the final dance motif) ($C = .526$, $p = .000$).

Table 5. Statistics for the chi square analysis of the relationship between the two factors and the 9 dance properties ($N = 122$)

	Independent Variables (factors)							
	GEOGRAPHIC AREA				DANCE FORM			
Dependent Variables (dance properties)	χ^2	df	C	p	χ^2	df	C	p
Metro	37.475	9	.485	.000	64.165	27	.587	.000
Tempo	4.314	6	.185	.634	32.496	18	.459	.019
Dynamiki	1.128	4	.096	.890	29.891	12	.444	.003
Lavi	27.671	4	.430	.000	21.909	12	.390	.039
Diataksi	52.267	6	.565	.000	78.719	18	.626	.000
Kinkatmo	7.239	3	.237	.065	26.687	9	.424	.002
Kinbmot	11.069	5	.288	.050	49.448	15	.537	.000
Kincmot	10.453	5	.281	.063	46.766	15	.526	.000
Forma	7.475	5	.240	.188	16.711	15	.347	.336

χ^2 = chi square statistic, C = contingency coefficient $= sqrt\,[\,\chi^2 / (N + \chi^2)\,]$, df = degrees of freedom, p = probability (significance) (* Bonferroni correction for multiple tests: $p \leq 0.0056$)

Nonlinear canonical correlation between the 9 dance properties and the two factors (area, form)

According to *Table 6* there are relatively low proportions of variation in the object scores that cannot be accounted for (explained) by the weighted combination of the variables in each set. For both sets of variables similar % variance values are present: sum

= 0.232. This indicates that the non-linear canonical correlation solution did not extract 23.2% of the variation in each set by both dimensions, which means that the non-linear canonical correlation model fitted quite well with the data, and this in turn shows that *the two sets of variables posses a rather stable relationship.*

Table 6. Summary of analysis for fit and loss of fit of the non-linear canonical correlation model (Set 1: 2 variables, Set 2: 9 variables; *N*=122)

		Dimension		*Sum*
		1	*2*	
Loss	*Set 1*	.089	.143	.231
	Set 2	.089	.143	.232
	Mean	.089	.143	.232
Eigenvalue (λ)		.911	.857	
Fit				1.768

Eigenvalue *(λ)* = 1 – mean loss per dimension.

The analysis extracted two dimensions of this relationship. This implies that *the non-linear relationship between the combination of georgraphic area & dance form and the combination of the 9 dance properties is realized in two independent dimensions.* The optimization process that produced these two dimensions was undertaken to maximize the relationship between the research variables. For dimension 1 the respective eigenvalue (λ_1 = 1 – .089 = 0.911) indicates that the 1st dimension extracted 91.1% of the relationship between the two sets of variables. An eigenvalue is the amount of shared variance between the two canonical variates (independent and dependent). For dimension 2 the respective eigenvalue (λ_2 = 1 – .143 = 0.857) indicates that the 2nd dimension extracted 85.7% of the relationship between the two sets of variables. Total fit is 1.768 = $\lambda1 + \lambda2$ = .911 + .857. Accordingly .911 / 1.768 = 51.57 or 51.6% if the actual fit is accounted for by the 1st dimension. The canonical correlation for dimension 1 is $R_{c1} = 2\lambda1 - 1$ = 2*0.911 – 1 = .822, whereas for dimension 2 is $R_{c2} = 2\lambda2 - 1$ = 2*0.857 – 1 = .714. *Both values* (eigenvalues and R_c) *indicate a rather high non-linear canonical correlation between the two factors (set 1) and the nine dance properties (set 2).*

The multiple correlation *(R)* between the combinations of the variables in each set and the object scores is computed by the formula $R = sqrt(\Sigma(W_i CL_i))$, where W_i are the weights, CL_i the component loadings, and *i* = 1, 2, 3 ..., *p* is the variable in the set *(Table 7).* Thus the respective multiple *R* values for dimension 1 are R_1 = 0.9550 for set 1 and R_2 = .9546 for set 2, and for dimension 2 are R_1 = 0.926 for set1 and R_2 = .926 for set2. For each dimension 1 – loss = R^2. For example, from the Summary of analysis in *Table 6* it appears that 1 – 0.232 = 0.768, which is approximately $(0.872)^2$. The loss of fit values was low and this results to *large multiple correlations between the weighted sums of the optimally scaled variables and the dimensions.*

Table 7. Weights and component loadings across dimensions and sets extracted from the non-linear canonical correlation analysis ($N = 122$).

Set	*Variables*	*Weights*		*Comp. Loads*	
		Dimension		*Dimension*	
		1	*2*	*1*	*2*
1	*Geographic Area*	0.528	–0.816	0.710	–0.619
	Dance Form	0.664	0.716	0.809	0.492
2	*Meter*	0.206	0.706	–0.226	0.644
	Tempo	–0.275	–0.505	0.115	0.025
	Dynamics	0.216	0.558	0.300	0.304
	Dance Handhold	–0.144	0.325	–0.421	0.364
	Dance Formation	–0.614	0.129	–0.709	0.429
	Kinkatmo	0.233	0.047	0.505	0.164
	Kinbmot (Semif.motif)	–0.388	–0.268	–0.566	–0.239
	Kincmot	0.259	0.216	0.227	–0.055
	Model of dance form	–0.138	–0.228	–0.237	–0.052

Table 8. Statistics for the partition of the fit (and loss) of the non-linear canonical correlation model to the data ($N = 122$).

Set	*Dependent Variables*	*Multiple Fit***			*Single Fit*			*Single Loss*		
		Dimension		Sum	*Dimension*		Sum	*Dimension*		Sum
		1	2		1	2		1	2	
1	Geographic Area	.278	.665	.944	.278	.665	.944	.000	.000	.000
	Dance Form[a]	.443	.515	.958	.440	.513	.953	.002	.002	.004
2	Meter[b]	.047	.505	.552	.043	.499	.542	.004	.006	.010
	Tempo[b]	.079	.260	.339	.076	.255	.331	.003	.005	.008
	Dynamics[a]	.049	.312	.361	.047	.312	.358	.002	.000	.002
	Dance Handhold[a]	.021	.105	.127	.021	.105	.126	.001	.000	.001
	Dance Formation[a]	.377	.021	.398	.377	.017	.393	.000	.005	.005
	Kinkatmo[a]	.054	.003	.058	.054	.002	.057	.000	.001	.001
	KinBmot (Semif)[a]	.151	.073	.224	.150	.072	.222	.001	.001	.002
	KinCmot(Final)[a]	.068	.048	.117	.067	.046	.113	.001	.002	.003
	Model of Dance Form[a]	.021	.053	.073	.019	.052	.071	.001	.001	.002

[a] Optimal Scaling Level: Single Nominal; [b] Optimal Scaling Level: Ordinal.
** Multiple fit = the variance of the multiple category coordinates for each variable

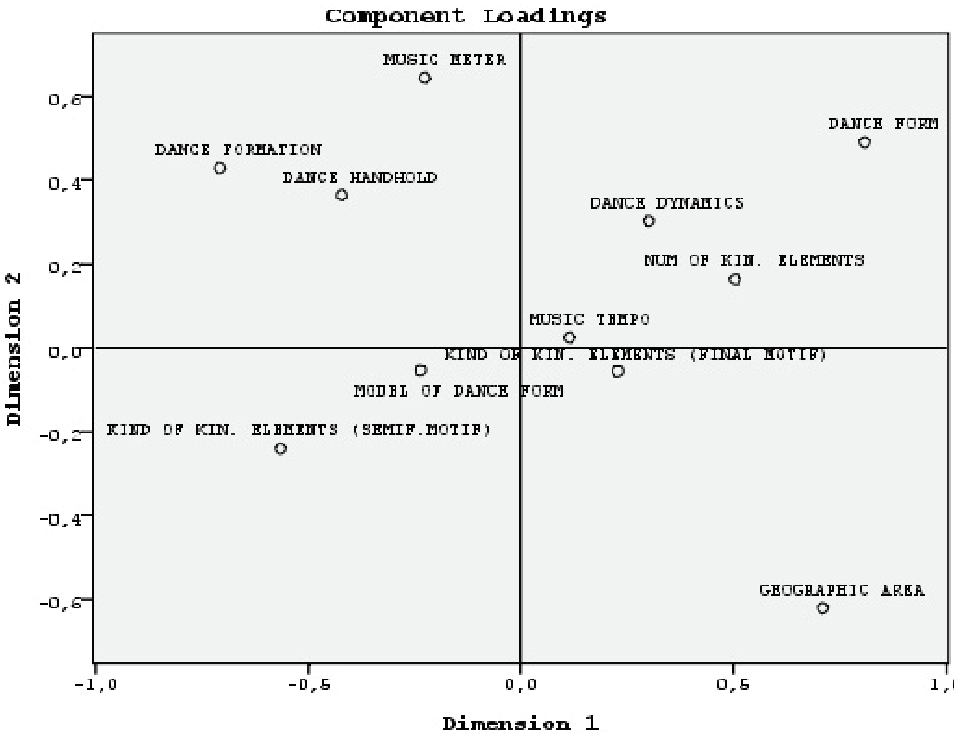

Figure 1. Plot of the component loadings extracted by the non-linear canonical correlation analysis ($N = 122$).

Table 8 presents the multiple fit, single fit, and single loss values produced by the nonlinear canonical correlation analysis. *By examining the multiple fit values we can see which variables discriminate best.* For the two variables of the 1st set *(factors)* the fit values summed across the two dimensions are 0.944 and 0.958, respectively. This information tells us that both variables in the 1st set provide about equal discriminatory power. For the nine variables of the 2nd set (dance properties) best sum of fits values are 0.552, 0.339, 0.361, and 0.398 for *Metro, Tempo, Dynamics,* and *Dance Formation,* respectively. These statistics show *that these particular variables substantially contributed to the association between the two sets of variables.* For each variable the single fit corresponds to the W^2 (squared weight) and is equal to the variance of the single category coordinates. By examining how the single fit is broken down across dimensions we see that *Dance Form* discriminates about equally in both dimensions, whereas *Geographic Area* discriminates mostly in the 2nd dimension. This means that *the four categories of Dance Form are about equally spread across both dimensions, whereas those of Geographic Area spread mostly in the 2nd dimension.*

There are no missing data in the two sets of variables. Thus, the component loadings (*CLs*) are equivalent to the Pearson correlations between the quantified variables and the object scores. These correlations are *graphically depicted as distances from each* *variables' point to the origin of the axis and approximately reflect the importance of the respective variables with regards to each dimension.* The canonical variables are represented by the horizontal and vertical lines *(Figure 1).* By looking at the component loadings in the table and their location in the 2-dimensional space we can infer that there are two directions of relationships that do not coincide with the vertical and horizontal axes: (1) one direction of relationships is determined by Geographic Area on one side and Dance Formation & Dance Handhold on the other side; (2) the second direction of relationships is determined by Dance Form on one side and Kind of Kinetic Elements of the semifinal dance motif (KinBmot), with Dynamics and Number of Kinetic Elements (Kinkatmo) playing a moderate role in this direction of relationships.

DISCUSSION

The main inferential finding of the present study was that there is a significant difference between the *terrestrial* and *insular* distribution of dances across the four levels of *dance form* (*identical*, *heteromorphic*, *varied*, *remodeled-related*). Moreover, the non-linear canonical correlation analysis proved that the two sets of variables (two factors, 9 dance properties) possess a rather stable multivariate non-linear dependence confirmed by the high eigenvalues ($\lambda_1 = .911$, $\lambda_2 = .857$), the large multiple correlations between the weighted sums of the optimally scaled variables and the dimensions ($R > .925$), as well as the low percentages of common unexplained variance in both dimensions (23.2%). This finding further substantiates the use of the typological-morphological method for the initial grouping-classification of the research sample as well as its subsequent geographical categorization in *terrestrial* and *insular* dances. Both factors equally determined the strength of the association between the two sets of variables, something that was also established by their high sums of multiple fit values across both extracted dimensions of this association. Overall, this analysis shows that when both factors were taken together a high level correlation is produced with the optimal combination of the 9 dance properties, with the importance for each individual variable as described above. This reflects the high importance of the interaction between geographic area and dance form in essentially determining high levels of nonlinear canonical dependence to the 9 dance properties.

Using a combination of methods for the analysis of the dance form, Tyrovola ended up at the determination of the type of form of the dance 'choros sta tria' (structure and style). This type served like McKinney's standard (1969, 1970) as an abstractional set of purposively selected and combined formal properties, which were used as a point of reference for the comparisons between the dance forms of the study sample. According to the rules of the typological method (MCKINNEY 1970), the identification of the separate form subcategories came as a result of their divergence from the basic type. NAHACHEWSKY (1995) states that the validity of a typological ranking is not based so much on its underlying elements but mainly on the way it is used. In the present case, the use of the type of "choros sta tria" as a point of reference for the classification of the study sample came as a result of the thorough, level by level morphological analysis. This fact facilitated the confirmation of the research hypotheses and the possibility of a further application of this taxonomy. The finding of statistically significant differences between the *terrestrial* and *insular* distribution of dances across the four levels of *Dance Form* confirmed the appropriateness of Tyrovola's four category taxonomy (1994, 2001), investing it with the power of a multivariate statistical method.

With regards to the geographical categorization of the dances, the properties that mainly determined the difference between the terrestrial and insular dances (chi square analysis) were *metro* ($C = .485$, $p = .000$), *dance handhold* (lavi) ($C = .430$, $p = .000$) and *dance formation* (diataksi) ($C = .565$, $p = .000$). Furthermore, *metro, tempo, dynamics,* and *dance formation* were the ones among the nine variables of the 2nd set (dance properties) that had the best sum of fits values (0.552, 0.339, 0.361, and 0.398, respectively). These results came in accordance with the modern Ethnomusicologists' points of view that the music meter is one of the main diversifying elements of the dance-music tradition of mainland and insular areas of Greece (Baud-Bovy 1984). In addition, these results agree with the findings of the Choreometrics project (Bartenieff et al. 1969), where 2,138 dance sequences from different areas of the world were analyzed and clustered in 18 discernible geographic-dance traditions according to the geographic variability of their movement style. Through the use of a statistical method of analysis, factors like the rhythmical organization of dance music, the dance formation (according to the dancers' sex), the dynamics, the kind and size of dance movements, etc. proved to be important for the classification of the research sample (Lomax 1971).

With regards to the morphological categorization of the dances, the properties that mainly determined the difference between the *identical*, *heteromorphic*, *varied*, *remodeled-related* dance forms were *metro* ($C = .587$, $p = .000$), *dynamics* (dynamiki) ($C = .444$, $p = .003$), *dance formation* (diataksi) ($C = .626$, $p = .000$), number and kind of the kinetic elements of the final and semifinal dance motifs [*kinkatmo* ($C = .424$, $p = .002$), *kinbmot* ($C = .537$, $p = .000$), and *kincmot* ($C = .526$, $p = .000$)]. According to Martin (1972) each different dance type is characterized by such homogeneity in the elements of its rhythmical organization (meter, dynamics, tempo), in a way that every single melodic differentiation adapts to the metrical-rhythmical character of its dance species. Besides, the interaction and interdependence between the structural elements of dance and music are factors that shape the structure of folk dances (Felfoldi 2007).

The multiple relationships between the structure of dance and music come as a result of many different possible combinations of the expansion of the structural unities, the succession of the structural unities, and the correspondence of the structural unities at different levels (Reynolds 1974). As a result, the fact that the four subcategories were expansions, successions or variations of the form of the basic structural type of the dance "choros sta tria," made their segregation according to the elements of their rhythmical organization more than expected. For the same reason, the number and kind of the kinetic elements of the two final and adversative (regarding the use of space) kinetic motifs, as well as the dance formation served as variating factors for the basic type's style, representing distinctive affinity relationships with it. Similar morphological comparisons of taxonomic subcategories that were grouped according to their relationships with a basic structural type (Sifakis 1997) ended up at the finding that the variations are mainly found at the level of rhythmical changes, or at the level of the basic type expansion with the use of extra kinetic elements. Finally, the fact that dance formation came up as one of the variables that determined the statistical differences between the four morphological categories came as a consequence of the geographical categorization of Tyrovola's initial sample, since the two independent factors were cross tabulated and tested in combination.

From the results of the nonlinear canonical correlation it was shown that the relationship between the combination of geographic area and dance form and the combination of the 9 dance properties was realized in two independent dimensions. Looking at the variables' component loadings (*Table 7* and *Figure 1*) and single fit *(Table 8)* concurrently, we can infer that the 1st dimension is interpreted by the interaction between *dance form* and *kind of kinetic elements of the semifinal dance motif (kinbmot).* By examining how the variables' single fit is broken down across this dimension, we realize that the strength of this relationship was reinforced by the variables *kinkatmo, kibmot, kincmot (number* and *kind of kinetic elements)* and *dance formation*. This result confirms Tyrovola's finding (1994) according to which the number and kind of kinetic elements of the semifinal and final dance motifs are morphological elements of dance form that represent the *variant properties* of the form of the dance "choros sta tria" and shape its stylish alterations. The 2nd dimension of the nonlinear canonical correlation analysis is determined by the interaction between *geographic area* and *dance formation – dance handhold*, indicating once more the geographic variability of these certain elements of the dance structure. By examining how the variables' single fit is broken down across the 2nd dimension, we can infer that the strength of this relationship was mainly reinforced by the variables *metro*, *dynamics* and *tempo.* According to FELFÖLDI (2007) different regional dance types and their music show affinity to certain rhythmic schemes whose meter, rhythm and tempo have a strong effect on the morphological characteristics of the dances. The geophysical conditions more or less create a restraining context for the adjustment of the local community, affecting in this way the composition of its cultural identity (NITSIAKOS 2003). The local tradition is shaped according to the wider area relationships which are not static but change in time (NITSIAKOS 2003). In the case of dance, these area relationships are directly connected to the historical and social organization of the community and act as shaping factors of everyday life conditions, affecting or determining in this way the rhythmical, melodic and kinesiological content of the local tradition (TYROVOLA 2003). These findings however, verify the need for a comparative analysis and research of the connections between dance structure and music structure placed into a broad geographical framework, in order to test inquiringly how and/if the ways with which a society is socially and politically organized and changed affect its adaptation to the natural environment.

Consequently, the results of the present research validate TYROVOLA's (1994) model for the classification of dance forms according to their affinity with the kind of form and structure of the dance "choros sta tria." This confirmation is of major importance especially in the context of Greek folk dance research and teaching. The understanding of the way or ways that dance motifs and/or phrases are structured according to combinations between certain dance form properties is a basic requirement either for the process of dance analysis or for the process of dance-technique learning.

The present findings further substantiate the consistency of both qualitative and quantitative methods in the study of dance and especially dance form (structure and style). So far dance research is dealt mainly with qualitative research methods or methods that belong to musicology and structural linguistics (LAWLER 1984; KAEPPLER 1971, 1972; MARTIN – PESSOVAR 1961, 1963). However, the present study went a step further. The combination of the structural-morphological method of dance analysis (qualitative) with the non-linear canonical correlation analysis (quantitative) substantiated the fact that between the two methods there is a direct interconnection. Both of them are based upon mathematical reasoning. Therefore, their potential application in the study of folk dance should be encouraged, since their methodological blending can further highlight already existing models. A basic prerequisite is the structuring of the main analyses according to a valid theory and a carefully organized methodological design, in order to avoid double methodological problems. In the present study, the initial typological classification of the 122 Greek folk dances together with their subsequent terrestrial – insular geographical taxonomy permitted the use of a multivariate statistical approach and the study of their structure and style as a multifactorial socio-cultural phenomenon.

The present attempt shed light firstly on the possibility of the inter-scientific study of Greek folk dance substantiating that there is no qualitative research without quantitative elements and analysis or the opposite (see for instance GEFOU-MADIANOU 1999) and secondly on the possibility of combining both qualitative and quantitative analyses in the study of folk dance. Finally, it is worthwhile to mention that the present research supports KUHN's view (1981), who states that a science's success is not an issue of the application of new research technologies or the accumulation of new research data, but an issue of the afresh analysis of the already existing data with a totally different way.

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APPENDIX 1

Identical **dance forms**						
			(MD1) "Strogylos" dance (Area: Malakopi Cappadocia)			
A/ΟΦ	F·3	2/4 (1+1)	MD1=	$\{M1[\delta^{1/4}+\alpha^{1/4}]+$	$M2\ [\delta^{1/4}+(\delta)\alpha_7{}^{2/8}]+$	$M3\ [\alpha_o{}^{1/4}+(\alpha_o)\delta_2{}^{2/8}]\}$
(♫♫)	P/La	♩~ 66				
= / Im. / Ir.	↺	M				
Γ	Οχ.	Κχ.				

Identical **dance forms**						
			(MD2) "Makroulos" dance (Area: Potamia Cappadocia)			
A/ΟΦ	F·3	2/4 = (1+1)	MD2=	$\{M1[\delta^{1/4}+\alpha^{1/4}]+$	$M2\ [\delta^{1/4}+(\delta)\alpha_2{}^{1/4}]+$	$M3\ [\alpha_o{}^{1/4}+(\alpha_o):\delta_4{}^{1/4}]\}$
(♩.♪)	P/La	♩~ 50				
≡ / Im / Ir	↺	M				
Γ	Οχ.	Κχ.				

Figure 2. Morphic type of Identical dance forms

Heteromorphic **dance forms**						
			(i) (XD3) "Enas kontos kontoutsikos" dance (Area: Polygyros Halkidikis)			
AB/ΟΦ	F·3	4/8 (2+2)	XD3=	$\{X1[\delta^{2/8}+\alpha^{2/8}]+$	$X2\ [\delta^{2/8}+(\delta)\alpha_7{}^{2/8}]+$	$X3\ [\alpha_o{}^{2/8}+(\alpha_o)\delta_7{}^{2/8}]\}$
(♩♫.♬)	MF/An	♩~ 84				
≡ / Ir / Im	↺	X				
Γ	Οχ.	Κχ.				

Heteromorphic **dance forms**						
			(ii) (WD4) "Omal kars" dance (Area: Kars, Black Sea)			
A/ΟΦ	F·3	2/4 (1+1) =	WD4=	$\{W1[\delta^{2/8}+\alpha^{2/8}]+$	$W2\ [\delta^{2/8}+(\delta)\alpha_5{}^{2/8}]+$	$W3\ [\alpha_o{}^{2/8}+(\alpha_o)\delta_5{}^{2/8}]\}$
(♩♪♬)	MF/An	♩~ 104				
≡ / Im / Ir	↺	W				
ΑΓ	Οχ.	Κχ.				

Heteromorphic **dance forms**						
			(iii) (XD5) "Issos" dance (Area: Kalymnos, Dodekanese)			
A/ΟΦ	F·3	2/4 (1+1)	XD5=	$\{X1[\overset{>}{\alpha_o}{}^{2/8}+(\overset{>}{\delta}{}^{1/8}-\overset{>}{\alpha_o}{}^{1/8})]+$	$X2\ [\overset{>}{\delta}{}^{2/8}+\overset{>}{\alpha}{}^{2/8}]+$	$X3\ [\overset{>}{\delta}{}^{2/8}+(\overset{>}{\alpha_o}{}^{1/8}-\overset{>}{\delta}{}^{1/8})]\}$
(♩ ♬♬)	Fo/An	♩~ 120				
≡ / Im / Ir	↺,	X				
ΑΓΓΑ	Οχ.	Κχ.				

Figure 3. Morphic type of Heteromorphic dance forms

***Varied* dance forms**						
(MD6) **" Pera ston pera mahala" dance (Area: Chaliki Trikalon, Patoulia Karditsas)**						
Α/ΟΦ	F-3	4/4 (2+2) =	MD6=	{M1[$\delta^{2/4}$ + $\alpha^{2/4}$] +	M2 [$\delta^{2/4}$ + (δ) $\alpha_1^{2/4}$ _ $\alpha_2^{2/4}$)] +	M3 [$\alpha_o^{2/4}$ + (α_o) $\delta_1^{2/4}$ __ $\delta_2^{2/4}$]}
(♩♫ ♫ ♫ ♪)	MF/ Ad	♩~ 65				
= / Ιμ / Ιρ	↺	M				
Α Γ	Οχ.	Κχ.				
***Varied* dance forms**						
(WD7) **" Pera ston pera mahala" dance (Area: Sofades Karditsas)**						
Α/ΟΦ	F-4	4/4 (2+2) =	WD7=	{W1[$\delta^{1/2}$ + $\alpha^{1/2}$] +	W2 [$\delta^{1/2}$+ (δ)$\alpha_2^{1/2}$] +	W3 [$\alpha_o^{1/2}$ + (α_o)$\delta_2^{1/2}$] +
(♩♫ ♬ ♪)	MF/ Ad	♩~ 65				
= / Ιμ / Ιρ	↺	W		+ W4 [(α_o)$\delta_3^{1/2}$ + (α_o)$\delta_2^{1/2}$]}		
Γ	Οχ.	Κχ.				
***Varied* dance forms**						
(MD8) **" Pera ston pera mahala" dance [Area: Koumades (Stavros) Karditsa]**						
Α/ΟΦ	F-5	4/4 (2+2) =	MD8=	{M1[$\delta^{1/2}$ + $\alpha^{1/2}$] +	M2 [$\delta^{1/2}$+ (δ)$\alpha_2^{1/2}$] +	M3 [$\alpha_o^{1/2}$ + (α_o)$\delta_2^{1/2}$] +
(♩♫ ♬ ♪)	MF/ Ad	♩~ 65				
= / Ιμ. / Ιρ.	↺	M		M4 [δ $^{1/2}$ + (δ)$\alpha_2^{1/2}$] +		M5[$\alpha_o^{1/2}$ + (α_o)$\delta_2^{1/2}$]}
Γ	Οχ.	Κχ.				

Figure 5 *Morphic types of Remodeled-Related dance forms*

Remodeled- Related dance forms						
(WD9) **"Tik monon" dance (Area: Aetorachi, Veria, Imathias)**						
Α/ΟΦ	F-3	5/8 (3+2)	WD9=	{W1[$\delta^{3/8}$ + $\alpha^{2/8}$] +	W2 [$\delta^{3/8}$+ (δ)$\alpha_7^{2/8}$] +	W3[$\alpha_o^{3/8}$ + (α_o)$\delta_2^{2/8}$]}
(♪♩♫)	F_o/Pr	♩~ 300-380				
= / Εμ / Ιρ	↺	W				
ΑΓ	Οχ.	Κχ.				
Remodeled- Related dance forms						
(MD10) **"Eleni kopela" dance (Area: Hariessa, Pellas, Macedonia)**						
Α/ΟΦ	F-3	7/8 (4+3) =	MD9=	{M1[$\delta^{1/4}$ + $\alpha^{1/4}$+ ($\delta^{2/8}$ – $\alpha^{1/2}$)] +		
(♬♫)	F_o /M_o	♩. ~ 154		M2 [$\delta^{1/4}$ + (δ)$\alpha_7^{2/8}$ + ($\alpha_o^{2/8}$ - $\delta_o^{1/8}$)] +		
= / Εμ / Ιρ	↺	M		M3 [α_o+ (α_o)$\delta_7^{2/8}$ + ($\delta^{2/8}$- $\alpha^{1/8}$)]}		
Γ	Οχ.	Κχ.				

Figure 4. Morphic types of Varied dance forms

<table>
<tr><td colspan="7">Remodeled- Related dance forms</td></tr>
<tr><td colspan="7">(WD9) "Tik monon" dance (Area: Aetorachi, Veria, Imathias)</td></tr>
<tr><td>A/ΟΦ</td><td>F·3</td><td>5/8 (3+2)</td><td rowspan="4">WD9=</td><td rowspan="4">$\{W1[\delta^{3/8} + \alpha^{2/8}] +$</td><td rowspan="4">$W2\ [\delta^{3/8} + (\delta)\alpha_7{}^{2/8}] +$</td><td rowspan="4">$W3[\ \alpha_o{}^{3/8} + (\alpha_o)\delta_2{}^{2/8}]\}$</td></tr>
<tr><td>(♪♩♫)</td><td>Fo/Pr</td><td>♩~ 300-380</td></tr>
<tr><td>= / Εμ / Ιρ</td><td>↺</td><td>W</td></tr>
<tr><td>ΑΓ</td><td>Οχ.</td><td>Κχ.</td></tr>
<tr><td colspan="7">Remodeled- Related dance forms</td></tr>
<tr><td colspan="7">(MD10) "Eleni kopela" dance (Area: Hariessa, Pellas, Macedonia)</td></tr>
<tr><td>A/ΟΦ</td><td>F·3</td><td>7/8 (4+3)</td><td rowspan="4">MD9=</td><td colspan="3">$\{M1[\delta^{1/4} + \alpha^{1/4} + (\delta^{2/8} - \alpha^{1/2})] +$</td></tr>
<tr><td>(♫♫♫)</td><td>Fo /Mo</td><td>♩. ~ 154</td><td colspan="3" rowspan="2">$M2\ [\delta^{1/4} + (\delta)\alpha_7{}^{2/8} + (\alpha_o{}^{2/8} - \delta_o{}^{1/8})\ ] +$</td></tr>
<tr><td>= / Εμ / Ιρ</td><td>↺</td><td>M</td></tr>
<tr><td>Γ</td><td>Οχ.</td><td>Κχ.</td><td colspan="3">$M3\ [\ \alpha_o + (\alpha_o)\delta_7{}^{2/8} + (\delta^{2/8} - \alpha^{1/8})]\}$</td></tr>
</table>

Figure 5. Morphic types of Remodeled related dance forms

<table>
<tr><td colspan="4">Name of the dance</td></tr>
<tr><td>Form model</td><td>Dance phrase (# motifs)</td><td>Music meter, (congruence)</td><td rowspan="4">Kinetic type
WD, XD, MD = dance in relation to various handholds

M1, W1, X1= dance motifs in relation to certain use of space

{ }= dance phrase

[ ] = dance motif

(α-δ) / (δ-α) = dance cell</td></tr>
<tr><td>Rhythmic scheme</td><td>Music: Dynamics/Speed</td><td>Tempo</td></tr>
<tr><td>Dimensional relationship between dance & music / Rhythm & rhythmic organization</td><td>Direction of the dance</td><td>Dance handhold</td></tr>
<tr><td>Dancers (sex and formation)</td><td>Kind of dance (number of dancers)</td><td>Kind of dance (use of space)</td></tr>
</table>

Figure 6. Abbreviation and graphic symbls for the musical structure and form of the dance

(i) Form model:
- A/ΟΦ = one segment homogeneous chain form
- AB/ΟΦ = two segment homogeneous chain form
- ΠΦ = varied chain form

(ii) Structural levels of dance:
- F·3, F·4, F·5= number of motifs in a dance phrase (F)

(iii) Relationship of congruence:
- = congruent relationship between music and dance
- = discongruent relationship between music and dance

(iv) Dynamics of music performance:
- Fo = Forte (loud)
- FF = Fortissimo (very loud)
- MF = Mezzo forte (moderately loud)

- P = Piano (soft)
- MP = Mezzo piano (moderately soft)

(v) Speed of music performance:

- La (Larghetto) = 60-65 ♩ per minute
- Ad (Adagio) = 66-75 ♩ per minute
- An (Andante) = 76-105 ♩ per minute
- Mo (Moderato) = 106- 120 ♩ per minute
- Al (Allegro) = 121- 160 ♩ per minute
- Pr (Presto) 161- ; ♩ per minute

(vi) Dimensional relationship between music and dance:

- = = unison of dance and music
- ≡ = unison only of motifs

(vii) Rhythm and rhythmic organization:

- Iρ= isorhythmic structure, the absolute repetition of the same rhythmic form during the process of the melody.
- Iμ= isometric metre, maintenance of the metric union during the entire music piece.
- Eμ= heterometric metre, change of the metric union during the performance of the music piece which leads to the differentiation of the dance phrase and thus the dance form.

(viii) Direction of the dance:

- ↺ = open circle that moves to the right

(ix) Dance handhold:

- W = from the hands with bending elbows
- X= with arms crossing each other
- M = from the hands without bending elbows

(x) Dancers sex:

- A = men
- Γ = women

(xi) Dancers formation:

- AΓΓA = men at the front and at the back of the circle and women in the middle
- Γ = only women
- A= only men
- $A_Γ$ = two circles, one outside only men and one inside only women.
- $Γ_A$= two circles, one outside only women and one inside only men

(xii) Kind of the dance (number of dancers, use of space)**:**

- Oχ = group dance
- Kχ = circle dance

(xiii) Symbols for the legs

- δ = right foot (either a support or a gesture)
- α = left foot (support or gesture)

(xiv) Symbols for leg supports:

- δ = right foot to the right
- α = left foot to the right

- δ_o = right foot to the left
- α_o = left foot to the left

(xv) Symbols for leg gestures:

- α/δ_1 = lift of the left/right leg in front of the central line of the body with bending knee
- α/δ_2 = projection on the toes of the left/right foot
- α/δ_3 = the left/right foot stops on the toes (no weight bearing) to the side and slightly at the back of the other foot
- α/δ_4 = support and parallel position of the left/right foot next to the other foot
- α/δ_5 = support and stamping of the left/right foot
- α/δ_6 = slightly bent gesture of the left/right foot at the back of the other leg (at the level of the opposite knee)
- α/δ_7 = slightly bent gesture of the left/right foot in front of the other leg (at the level of the opposite knee)
- α/δ_{10} = no weight bearing crossing leg gesture

(xvi) Other symbols for movements of the legs:

- **$(\alpha)\delta$ / $(\delta)\alpha$** = two movements take place, either simultaneous or in succession
- = join of two supports, maintenance of support in the same position
- $\delta{:}\alpha$/ $\alpha{:}\delta$ = stand on both feet
- $[\alpha(\delta)x - \delta]$ = crossing weight bearing gesture of the left foot to the right, in front of the right foot and return on the right foot
- $[x(\alpha_o)\delta_o - \alpha_o]$ = crossing weight bearing gesture of the right foot to the left, in front of the left and return on the left foot
- = the foot moves to the right crossing in front of the other foot
- = the foot moves to the right crossing behind the other foot
- = diagonal forward right
- = diagonal forward left
- = diagonal backward left
- = diagonal backward right
- $\rightarrow$ = to the right
- $\leftarrow$ = to the left

$\uparrow$ = forward

- $\downarrow$ =backward
- $\leftrightarrow$ = motif in place
- = movements in place
- > = bending and stretching of the knee while moving