Structure and Proportion in Hindustani *Ālāp.*

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ABSTRACT: In this paper, I investigate structural proportions in improvised Hindustani (North Indian) vocal music. 235 examples of two types of *ālāp* were examined: 175 in the genre of *khayāl,* 60 in the genre of *dhrupad.* Both studio recordings and recordings of concerts were used. Three sets of proportions were investigated: the climactic arrival at the upper tonic as a proportion of the time till a point of structural change that is made explicit through rhythmic intensification (C:R), the first point as a proportion of the whole (C:W), and point of rhythmic intensification as a proportion of the whole (R:W). Average proportions for each genre, and the degree of consistency-flexibility within each genre were measured. The results show that proportions may vary between genres, but that flexibility-consistency does not. The data obtained were also used to investigate proportions and consistency-flexibility amongst singers of similar stylistic training, across individual singers, and across different performances by the same singer. The conclusions are followed by suggestions for a further, emic-driven examination of proportionality.

Submitted 2015 September 17; accepted 2017 March 17

KEYWORDS: *proportion, improvisation, Hindustani music, North Indian music*

INTRODUCTION

THIS paper examines comparability and consistency of proportions in the large-scale structures of Hindustani music. This investigation was prompted by two concerns. One is a tendency, often revealed casually in conversation, to think of improvised music in general, and in this instance Indian music in particular, as less structured than so-called 'composed' music, either as conceived in planning, or as perceived in evanescent performance and recorded artefact. An early instance of this thinking occurs in Fox-Strangways (1914): though forcibly rejected by Deshpande (1987) and given little serious critical academic credit, it still inhabits a certain part of popular consciousness. It is a thinking that reaches something of an apogee when Rowell (1992) writes that Indian music is 'pure process'. This is admittedly something of a glib statement, as all music is process, but nevertheless serves as evidence of the downplaying of both reiterated content, such as compositions,[2] and of resultant structure. Somewhat relatedly, the second is an analytic and pedagogic concern for the role of proportion in the creation of music. This concern has long been acknowledged with reference to European and European-derived composition, most notably in investigations of the Golden Section,[3] but has been less frequently applied to improvised music.

A broader aim is to extend the fine work done on continuity and grammar of performance by Slawek (1998) and Magriel (1997), Clayton's (2000) work on metered time in Hindustani performance, Widdess's (2011) development of "contour schema" understanding in *ālāp* performance, and Blume's (2003) discussion of underlying temporal relationships between phrases in *ālāp,* by noting the latter's summary statement, "proportion of musical time . . . is foundational to the conceptualization of ālāp", and examining time as proportion in Hindustani vocal performances. I have crafted this study as one of sound objects, drawing on Kramer's (1996) point that "musical time exists within listeners". Dubiel (1997) writes, "the structure of a work is whatever happens in it—whatever happens, as characterized through the deployment of whatever concepts help to make the work's identity specific and interesting *for us*". And though Sheehy (2013) points out that, as a process, "improvisation is not a structure that can be broken down into its constituent parts in order to see how it works (to paraphrase Ian Bent's (1987) definition of analysis)", it is self-evident that it is a process that produces objects, structures that are available for breaking down. Thus, this is a substantially 'etic' examination of Hindustani music, though I am not completely inexperienced in its performance, and I have participated in discussions of

'rushing' or 'dragging' sections of performances in post-concert conversations. It does not attempt to address the question of whether or not singers 'plan' proportionality in performance, preplanning, or training. It also does not address whether any such planning stems from abstract subdivision of a large span of time, or from the proportional 'balancing' of sections as they are created in turn. Thus, though Blum's point on the role of proportion in conceptualization is noted, it cannot be addressed at this stage. Such investigation should be carried out by a more emic-focused or emic-driven study. Nevertheless, as Wade (1984) writes, amongst the characteristics of *khayāl* is "the creation of a formally balanced . . . performance". This paper seeks to uncover a little of the structure of such balance.

RESEARCH QUESTIONS

My basic research question is "to what extent may consistent proportions be observed in the lengths of larger units of Hindustani classical performance?" This will be addressed by studying the durations of particular sections of vocal performance. In order to explain and elaborate this question, it is first necessary to outline the basic structures of Hindustani vocal performances, as some readers may be unacquainted with these. Specialists, I hope, will excuse some generalization. Two genres, *dhrupad* and *khayāl,* are examined. Both genres develop through overarching trajectories of ascent and explicit rhythmic intensification: the primary goal of the former being the climactic first sustaining of the upper tonic.[4] In *dhrupad* the singer(s) perform the *rāga* first as *ālāp,* sometimes referred to as *rāgālāp,* singing with apparent rhythmic flexibility, comparatively little articulation, and a substantially veiled pulse (if present). An increasingly articulated and rapid pulse is demonstrated in a section called *nomtom* or *joṛ;* the whole *ālāp- joṛ* structure may also be referered to as the *ālāp.* This is followed by the introduction of a specific composition or *bandish*, which is sung to a fixed metric cycle, *tāla,* and accompanied by a drum, the *pakhāvaj.* In *khayāl,* after a generally short *ālāp,* a *bandish* (sometimes referred to as a *cīz)* is sung to a fixed *tāla,* accompanied by the *tablā.* In most slow tempo *(vilambit)* performances, the singer or singers then perform the *rāga,* singing for the most part with a rhythmic flexibility comparable to that heard in *dhrupad,* but 'against' the *tāla,* only linking explicitly to the *tablā's* beat at the end of one time cycle and the beginning of the next.[5] This is sometimes referred to as *rupakālāp – ālāp* with form or shape – and the developmental process may be referred to as *baṛhat* or *upaj.* At some point, the rhythm becomes increasingly articulated and the subdivision of the beat greater and more complex – this process may be referred to as *layakārī.* Sanyal and Widdess (2004) define *layakārī* as patterns of cross rhythm against *tāla*. They note its occurrence, though not its ubiquity, in *khayāl* performance. I maintain that in most performances there is a noticeable and measurable point of articulatory intensification. Subsequently the singer introduces a second composition in a faster tempo *(madhya* – moderate, or *drut* – fast) and frequently in a different *tāla*. Performances studied adhere to this model, though there are other approaches. A significant one is that some singers of *khayāl* precede the composition with an extensive *ālāp,* reaching the upper tonic, in the style of a *dhrupad ālāp.* In such cases, this *ālāp* has been treated as a *dhrupad ālāp.* Clear markers exist for both intensifying trajectories in *dhrupad:* the arrival at the upper tonic, and the subsequent switch from *rāgālāp* to *joṛ*. The pitch trajectory is generally clear in *khayāl*, but a shift in rhythmic profile comparable to that found in *dhrupad* may be neither as apparent nor as consistent in its occurrence. Nevertheless, the process of intensification is sufficiently similar in the two genres for following schema to be observed in the first part of a performance: a substantial *ālāp,* including a 'fixed' composition in the case of *khayāl,* develops to a climactic point at which the upper tonic is sounded (referred to as "C" in the ratios to be discussed below),[6] followed by a more or less clear point of rhythmic intensification, *jor* in *dhrupad, layakārī* in *khayāl* (referred to as "R"). This part of the performance reaches a clear close (referred to as "W", for "whole"), to be followed by the introduction of a fixed composition in *dhrupad, or* a second composition in *khayāl.* These subsequent sections have not been examined: partly in response to the concerns raised at the start of this paper, I have focused on those parts of the performance which are most likely to be characterized as 'free'.

Since *khayāl* is generally thought to be the more structurally flexible, and the more frequently performed of the genres, greater attention was initially paid to this genre (175 examples). A smaller number (60) of *dhrupad* performances were examined. I have examined proportions, patterns and consistency across performances as a whole, separately across performances of *dhrupad* and *khayāl,* within a subset of *dhrupad* performances given by performers of the best-known *dhrupad* styles – the *Dagarbānī,* within *gharānās,* here best understood as stylistic lineages[7] – and finally within performances by individual singers.

I anticipated that comparing the results across the two genres may shed light on the conventional wisdom that *dhrupad* is the more rigidly structured of the two. Does *dhrupad* as a genre exhibit greater proportional consistency, and are individual *dhrupad* singers more consistent themselves than singers of

khayāl? My initial expectation was that a greater level of consistency might emerge in *dhrupad,* and that measurements may also be used as a baseline for consideration, in one aspect of style, of the conventional wisdom that some performers (in the past clustered in *khayāl gharānās)* perform in a style "closer to *dhrupad",* by comparing timings and investigating consistencies.[8] Comparable results might lead to stronger empirical conclusions in terms of actual musical style, and moreover aid in our empirical understanding of the evolution of musical genres.

Sample and Exclusions

The sample was created by first using the rather arbitrary base of my own collection of CDs and tapes. An unintended consequence of this was that the initial sample included singers of substantial reputation. This was then expanded through the use of Youtube, with a particular effort being made to find further performances by singers already represented. Further examples by less well-known singers were added last. The collection of examples stopped once new examples ceased to produce any obvious change to average values or standard deviations. All examples in which the voice was faded in or out were excluded, as were a small number of examples where it was obvious that internal cuts had been made. As the process of exclusion was often quite quick – I quickly learnt to check the end of recordings, rather than waiting up to forty minutes to find that the recording faded out – I did not keep precise details of how many examples were excluded, but at a rough estimate, these amounted to about a quarter to a third of items that were otherwise appropriate.

I have not examined instrumental *ālāp:* the greater range of instruments, particularly extending above the upper tonic, might result in a very different set of figures from that acquired from singers, who in many cases proceed to a pitch no more than a third above the upper tonic. It might be feasible only to carry out such measurements on an instrument by instrument basis.

The *ālāp* sections of all examples would be characterized as 'slow' by practiced listeners. Within this parameter, the range of absolute tempo was not considered. Measuring absolute tempo is difficult in *dhrupad,* for though it is present in *ālāp,* at least amongst some stylistic lineages (Widdess 1994) – my own teacher neither referred to it nor overtly demonstrated it – it is greatly attenuated, and 'hearing' it may be somewhat antithetical to a singer's intent. Though absolute tempo can be easily measured in *khayāl* through reference to the *tablā,* the perception of *sung* tempo is heavily dependent on a singer's subdivision of the beat, and the aesthetic of apparent rhythmic flexibility. Attenuation of the pulse characteristic of *dhrupad* is also prevalent in the early parts of most performances.

METHOD

I have examined recordings of *khayāl* and *dhrupad* that feature an extensive *ālāp.* Only *vilambit* (slow) examples of *khayāl* are used. Performances range in length from 7'55 to 55'00 for *khayāl,* and 12'37 to 59'07 for *dhrupad.* Recordings were of both studio and concert performances. For *dhrupad*, the endpoint is taken as the articulation of the last note of the *ālāp,* (after the *joṛ),* and for *khayal*, as the last note before the change of *tāla* and/or tempo.

I have measured not one but three start points for *khayāl:* the initial sung sound, the start of the *bandish,* and the start of the *baṛhat.* The first has been used as the primary measuring point through the paper. Examining the others allows for an examination of the effect of flexible elements in *khayāl* performance. Some singers commence the *bandish* immediately, but most precede it with *ālāp* of varying length. The longest such *ālāp,* excluding those that actually reached the upper tonic, lasted just over ten minutes. Performers also vary in the amount of pre-composed material sung prior to commencing the *baṛhat,* from little more than 20 seconds to over five minutes.[9]

The climactic point ("C") at which the upper tonic is reached and sustained for the first time is generally clear, though given the "teasing" in which some singers indulge, there were occasions where a subjective decision was made. Considering the length of the *ālāp* however, this is likely to have made a difference of only a few percent.

As discussed, when outlining the genres, the next point measured is quite clear in *dhrupad* but frequently less so in *khayāl*. This point marks the transition from *ālāp* to *joṛ* in the former, and the comparable point, the beginning of *layakārī* in *khayāl.* These moments initiate or make explicit an increasing foregrounding of rhythm, contrasting with the attenuation that characterizes the first part of *ālāp.* The start of the *layakārī* is clearer in some performers than in others and may be emphasized by a slight increase in tempo: these distinctions themselves are indicators of a range of *khayāl* styles. In most *khayāl ālāp,* this transition occurs after the upper tonic has been reached. However, in a relatively small number of cases, it precedes this. For example, the use of slow *sargam,* improvising using note names as text may foreground rhythm. In spite of such processes, a second point of intensified rhythmic

foregrounding may usually be noted, after the upper tonic has been reached. This has been the point of measurement. There were some performances, usually older ones, where a decision about the location of this second measuring point could not be confidently made. Such performances, along with others that followed quite different structures, were excluded. Three sets of proportions were derived from these measurements: the arrival at the point of climax (upper tonic) as a proportion of the time till the rhythmic intensification of *layakārī* or *joṛ* (C:R), the same point as a proportion of the whole (C:W), and start of the *layakārī* or *joṛ* as a proportion of the whole (R:W).

RESULTS

A summary of the overall results is found in Table 1.

Table 1: Overview of average proportions (given as percentages) and standard deviations (in brackets) of all performances and of performances by genre.

Genre and point of initial measurement	**C:R**	**C:W**	**R:W**
all averages and standard deviations (n = 235)	79 (9)	55 (14)	70[10] (15)
dhrupad average and standard deviation (n = 60)	78 (9)	43 (14)	54 14)
khayāl average and standard deviation from start (n = 175)	79 (8)	59 (12)	73 (12)
khayāl average and standard deviation from *bandish*	77 (9)	56 (12)	73 (13)
khayāl average and standard deviation from *baṛhat*	73 (11)	51 (13)	70 (14)

The figures show a clear distinction between the genres as regards the beginning of rhythmic intensification (R:W), confirming a greater amount of time given over to explicit rhythmic intensification (after this point) in *dhrupad:* 46% of the whole in *dhrupad* compared to 27% in *khayāl.* This is perhaps not surprising, given both the greater rhythmic intensification generally associated with the former genre. In addition to the straightforward statistics presented above, analysis of variance (ANOVA) tests were carried out to confirm the significance of the difference between genres.[11] Regardless of which starting point was used for *khayāl,* $p = < 0.0001$. Significant difference was also found between genres as regards the climax relative to the whole (C:W, $p = < 0.0001$).

What is more surprising is that there is far less variation between genres, in fact almost none, when the point of climax is compared to the length of time prior to the beginning of rhythmic intensification (C:R, $p = 0.4246$). This is all the more interesting when the standard deviation, the spread of proportions is considered. This proportion is the most consistent one across all performances, and within each genre. Turning to the standard deviations for the proportions R:W, it appears that in *khayāl,* this formal sectionalisation, comparable to that into *ālāp-jor* in *dhrupad* is equally consistent. In addition, this sectionalisation is structurally key, in that it in turn is divided consistently by the climactic sounding of the upper tonic. But the most interesting feature to emerge is that though the average proportions vary between genres, the standard deviations vary only marginally: in-genre consistency is in fact marginally greater in *khayāl* than in *dhrupad.* Thus, the vaunted greater flexibility of *khayāl* is not to be found in the proportions exhibited in most performances. Some greater proportional flexibility does occur in proportions if measured from the beginning of the *barhat,* but this is negligible.

This flexibility is reflected in a degree of proportional difference across *khayāl* performances when the upper tonic is heard in in the *bandish* sung near the beginning of the performance – that is before the slow ascent to the climactic upper tonic. In this case the climax was reached sooner relative to the point of rhythmic intensification (C:R) than otherwise (see Table 2, $p = 0.0086$). Curiously, it occurred no sooner relative to the whole.[12]

Table 2: Average proportions (as percentages) of performance prior to *layakārī*, and of the whole depending on the presence of the upper tonic in the *bandish.* Standard deviations given in brackets.

Singing of upper tonic	C:R	C:W
all *khayāl*	79 (8)	59 (12)
Upper tonic in *bandish* (n = 82)	77 (8)	59 (11)
No upper tonic in *bandish* (n = 93)	81 (8)	59 (12)

Most importantly for considering consistency of *proportion,* the overall length of the performance had no consistent or substantial effect on the proportions of performances. In all comparisons, p = > 0.05. The following table shows this calculated according to quartiles.

Table 3: Average proportions (as percentages) of all performances grouped in quartiles according to duration. Standard deviations given in brackets.

Duration	C:R	C:W	R:W
all	79 (9)	55 (14)	70 (15)
< 18'04	80 (10)	57 (12)	71 (13)
18'08 – 23'33	77 (8)	55 (15)	71 (16)
23'34 – 34'39	80 (7)	57 (14)	70 (15)
34'40 – 59'07	78 (10)	51 (15)	65 (16)

Though there is a slight tendency for longer performances to spend greater proportion of the time in rhythmic elaboration, this is due to the greater number of long *dhrupad* performances: nine of the ten longest performances are of *dhrupad,* and whereas there are 26 *dhrupad* performances in the fourth quartile, there are only 10 in the first. This is confirmed when *khayāl* performances are examined separately (Table 4): the proportion of time spent in explicit rhythmic elaboration does not increase.

Table 4: Average proportions (as percentages) of *khayāl* performance grouped in quartiles according to duration. Standard deviations given in brackets.

duration	C:R	C:W	R:W
all	79 (8)	59 (12)	74 (12)
< 16'57	80 (9)	59 (11)	74 (12)
17'03 – 22'34	77 (9)	59 (13)	76 (13)
22'40 – 29'08	80 (6)	60 (12)	75 (14)
29'10 – 55'00	79 (12)	57 (13)	73 (14)

Finally, as shown by the figures for standard deviation across both genres (Table 3), the length of performance has little bearing on the consistency of proportions. The figures for *khayāl* do show one further potential area of flexibility: longer examples are more flexible in the time taken in reaching the upper tonic as a proportion of time before rhythmic intensification commences (C:R).

Khayāl gharānā groupings

McNeil (2007) has demonstrated that other aspects of *gharānās* are now of more significance than their being "schools of musical interpretation". Pragmatically, many singers have studied with teachers of more than one *gharānā.* Nevertheless, membership in or adherence to a single *gharānā* is frequently claimed: the following two tables are based either on such contemporary claims, or the historical association of older singers with particular *gharānās.*

Table 5: Average proportions (as percentages) and consistency of proportions (standard deviations given in brackets) within *khayāl gharānās.*

gharānā	No. of performers/of performances	C:R	C:W	R:W
khayāl	41/175[13]	79 (8)	59 (12)	74 (12)
Agra	4/4	79 (5)	42 (15)	55 (22)
Banaras	2/8	79 (4)	61(7)	78 (6)
Gwalior	5/21	72 (8)	55 (9)	77 (10)
Indore/Kirana	3/14	84 (8)	67 (12)	79 (10)
Jaipur	6/33	82 (8)	57 (10)	70 (12)
Kirana	4/19	81(9)	58 (12)	71 (11)
Mewati	2/12	78 (9)	70 (12)	89 (7)
Patiala	4/14	76 (5)	50 (9)	66 (10)
Rampur	3/7	75 (9)	63 (9)	84 (6)

As the standard deviations in Table 5 show, with a few exceptions – two proportions (C:W and R:W) from the Agra *gharānā,* and one proportion (C:R) exhibited by Kirana, Mewati and Rampur singers,

each *gharānā* is as consistent or more consistent across all proportions than the *khayāl* genre as a whole.[14] Examining the actual average proportions in performances, Table 5 also allows for a few observations on *gharānā* style, most notably the greater length of time given over to the slow development towards the upper tonic in the Indore performances (C:R and C:W: $p < 0.05$ in many comparisons) and the relatively small amount of time given over to rhythmically intensified singing by Pandit Jasraj and his student Sanjeev Abhyankar (Mewati *gharānā),*[15] and, perhaps a little surprisingly, by singers of the Rampur *gharānā* (R:W). Conversely, the greatest proportion of time is given over to such singing by the Agra and Patiala singers. In the case of Agra singers, this reinforces the widely-held assessment that the Agra *gharānā* is "closest to *dhrupad".* Singers associated with Banaras, Kirana and Jaipur *gharānās* produced performances that not only were proportionally consistent but adhered quite closely to the average proportions of the genre as a whole.

Dhrupad

My surprise at their being no appreciably greater consistency in *dhrupad* than in *khayāl* led me to look more closely at the *dhrupad* data. My initial thought was that this might be due to distinctions between discrete lineages *(bānīs)* of *dhrupad.*

Table 6: Average proportions (as percentages) and consistency (standard deviations given in brackets). comparing *Dagarbānī* and non-*Dagarbānī* performances.

dhrupad bānī	C:R	C:W	R:W
dhrupad	78 (9)	43 (4)	55 (14)
Dagarbānī (n = 35)	78 (10)	44 (14)	56 (14)
Non-*Dagarbānī* (n = 25)	78 (8)	42 (14)	54 (15)

Separating the 35 *Dagarbānī* performances from the 25 others, however, shows no distinction between these two groups in either proportion or consistency. Looking closely at the data for individual singers however shows that amongst the Dagar singers there is a high level of flexibility in the recordings of the senior brothers, Moinuddin and Aminuddin Dagar, and that there is one very unusually proportioned performance by Fariduddin Dagar. Other performances are both more consistent and closer to the averages. The Moinuddin and Aminuddin Dagar performances may represent different approaches to "reducing" a hypothetically more extensive performance to the limits of recording. Fariduddin Dagar's, which features a very early introduction of *layakārī,* is a reminder that individual singers may do things differently, sometimes on a particular occasion, sometimes consistently.

Individual Singers

Though I am cautious of extrapolating too much from a small number of performances, I have examined degrees of proportional consistency and flexibility across performances by individual performers. I have compared data within the output of performers of two or more items, first looking for consistency within performers' individual outputs (Table 7).

Table 7. Most consistent singers: averages as percentages, standard deviations in brackets.

Singer(s)	Genre	No. of performances	C:R	C:W	R:W
Z. & W. Dagar	*dhrupad*	2	83 (1)	42 (0)	51 (1)
Faiyaz Khan	*rāgālāp*	2	85 (1)	51 (1)	60 (1)
Bhatt & Ginde	*rāgālāp*	2	67 (1)	47 (3)	67 (0)
Fahimuddin Dagar	*dhrupad*	3	84 (3)	48 (1)	57 (1)
Wasifuddin Dagar	*dhrupad*	3	75 (3)	45 (2)	61 (1)
Falguni Mitra	*dhrupad*	4	77 (4)	37 (2)	48 (1)
Parween Sultana	*khayāl*	5	76 (4)	53 (1)	70 (2)
Z. & F. Dagar	*dhrupad*	4	71 (3)	47 (3)	65 (2)
Abhay N. Mallick	*dhrupad*	2	68 (5)	34 (1)	50 (2)
Channu Lal Mishra	*khayāl*	3	70 (1)	46 (4)	66 (5)
L.K. Pandit	*khayāl*	3	73 (0)	54 (4)	74 (6)

Though the number of performances compared is small, some singers showed remarkable consistency. *Dhrupad* singers were the most consistent, though some, such as Mohinuddin and Aminuddin Dagar, Fariduddin Dagar, Sayeeduddin Dagar, and Ram Chatur Mallick were much more flexible in their approach.

At the other extreme, some singers show great overall flexibility in proportions. All except the last two singers in Table 8 exhibit a degree of flexibility equal to or greater than the performances as a whole (in two of the three proportions). Only Fariduddin Dagar showed greater flexibility in all three proportions.

Table 8. Most flexible singers: averages as percentages, standard deviations in brackets.

Singer(s)	Genre	No. of perfs.	C:R	C:W	R:W
M. & A. Dagar	*dhrupad*	7	82 (16)	56 (20)	66 (13)
Fariduddin Dagar	*dhrupad*	3	75 (9)	36 (16)	47 (16)
Veena Sahasrabuddhe	*khayāl*	5	70 (10)	57 (14)	80 (12)
Jitendra Abhisheki	*khayāl*	7	68 (11)	59 (15)	85 (8)
T.D. Janorikar	*khayāl*	3	88 (4)	56 (12)	64 (17)
Pandit Jasraj	*khayāl*	8	80 (10)	74 (14)	91 (7)

Across the performances as a whole, and within each genre, the proportion of time spent reaching the upper tonic to the beginning of rhythmic intensification (C:R) is the most consistent. This particular consistency is strongest when individual performers are examined: C:R being the most or equal most consistent proportion for 26 of the performers. The second most consistent proportion is that of the start of rhythmic intensification to the length of the performance as a whole: this was the most or equal most consistent proportion for 21 of the performers. For 13 of the performers the proportion of the upper tonic to the whole is the most or equally-most consistent.

To recapitulate, the proportion that is most consistent (C:R) is in turn dependent on a proportion (R:W) that is consistent, and which is created by a basic and obvious sectionalisation in *dhrupad.* That this overarching sectionalisation into *rāgālāp* and *joṛ* is reproduced analogously in the less obvious *ālāp-layakārī* sectionalisation of *khayāl* speaks of the similarity of the two genres, and perhaps of a more general sense of, or approach to, proportion. This may be hinted at by comparing one instrumental performance to a select group of vocal performances: a performance by Zia Mohiuddin Dagar on the *rudra vīṇa,* a plucked chordophone, with a number of performances by several of his *dhrupad*-singing brothers. Most notably, Zia Mohiuddin reaches the upper tonic at 71% of the time before the *joṛ* (C:R) and at 36% of the total performance time (C:W), and begins the *joṛ* at 50% of the total performance time (R:W). Though the number of performances is too small to be conclusive, there are two interesting features of this performance. The first relates tenuously to the performances by Zahiruddin and Faiyazuddin Dagar, wherein the first proportion (C:R) averages at 71%, by Wasifuddin Dagar, where the same proportion averages at 75%, and by Zahiruddin and Wasifuddin Dagar, where the third proportion (R:W) averages at 51%. Thus, these proportions may be related strongly, across a cohort of related performers, to a particular structural approach.[16] The second feature is more suggestive. The *rudra vīṇa* possesses a substantially greater range than the voice. Yet neither the proportion of time spent reaching the upper tonic, which might result from greater exploration of the low register, nor the time spent in *rāgālāp,* which might result from greater exploration of higher registers, is substantially greater than in Dagar family singers: in fact Zia Mohiuddin Dagar spends a greater proportion of time in *joṛ* than all Dagar family singers except Zahiruddin and Wasifuddin Dagar. It is possible that the proportional structure of *rāgālāp* is treated with greater consistency, and that the potential for elaborate string-driven rhythmic elaboration is not *necessarily* exploited.

The potential for expansion of parts of performances leads to reconsideration of two singers that I initially considered excluding from the study on the grounds of atypical range: Laxman Krishnarao Pandit, who regularly descends, early in the *ālāp,* to a pitch an octave below the starting tonic, and Parween Sultana, whose range extends to well over an octave above the upper tonic. Looking at both individual performances and at performances as a whole (Table 9), it appears that in spite of the exploration of the lower register, Pandit spends no more time prior to reaching the upper tonic than the average. Similarly, the proportion of time Parween Sultana spends in *rupakālāp* is not increased by her exploration of the upper register. As both singers are quite consistent in their proportions across performances, it may be that a general sense of proportion comparable to that of other singers outweighs the potential exploitation of greater range.[17]

Table 9: Proportions (as percentages) in performers initially assumed to be atypical (standard deviations in brackets).

Singer	C:R	C:W	R:W
khayāl average	73	51	70
LK Pandit *Gujri Todi*	73	53	72
LK Pandit *Puriya*	73	59	81
LK Pandit *Yeman Kalyan*	74	52	80
LK Pandit average	73 (0)	54 (4)	74 (6)
Parween Sultana *Rajni Kalyan*	73	53	72
Parween Sultana *Din Todi*	73	52	71
Parween Sultana *Megh*	78	54	69
Parween Sultana *Puriya Danashri*	75	53	70
Parween Sultana *Jog*	83	55	66
Parween Sultana average	76 (4)	44 (1)	70 (2)

Aside from noting levels of consistency and flexibility, further aspects of singers' individual styles may be observed. One example will suffice. Amir Khan (7 performances) on average reaches the upper tonic after 75% of the performance as a whole and 90% of the performance prior to the *layakārī*, which in turn commences after 83% of the performance has passed. In other words, his structures exhibit greater rhythmic attenuation, and emphasize the lower and middle register, lingering over the ascent.[18] Only one LP recording approximates the average proportions of *khayāl* performances.

Comparisons can be made between different performances by the same performer. The following table (Table 10) compares four *dhrupad* performances by Falguni Mitra.

Table 10: Performances by Falguni Mitra (proportions as percentages).

Performance	Duration	C:R	C:W	R:W
Ahir Bhairav	18'04	79	38	48
Bageshri	17'05	76	38	49
Unidentified	30'00	72	34	47
Megh	28'38	82	40	48

The first two are studio recordings produced on the same date with the same personnel. They show a very high level of consistency. My initial thought was that this consistency stems from the proximity of the recordings, and from Mitra probably thinking of the same way of doing things. The other recordings are longer concert performances, and though variety in the initial build to the upper tonic is greater, it is not so by a particularly large degree. Perhaps more importantly, the proportion of time spent in *rāgālāp* is no greater than in the studio recordings. Taking this a step further, I have examined two performances of *rāg Kedar* by Malini Rajurkar: the first a studio recording made in 1983, and the second a concert recording from 1992 (Table 11).

Table 11: Performances of *rāg Kedar* by Malini Rajurkar: proportions as percentages, standard deviations in brackets.

Performance	Duration	C:R	C:W	R:W
Kedar 1983	23'00	76	62	81
Kedar 1992	37'37	63	51	80
Average of all performances (n = 8)	n/a	70 (7)	57 (6)	82 (4)

The proportion of time spent in *rupakālāp* (R:W) is effectively identical in the two performances. That this might be chance seems less likely once it is noted that this proportion is the most consistent across eight of her performances. If it is assumed that the studio recording of 1983 is "shortened", then this is achieved by not only reducing the overall length of the performance, but also by reducing the length of time spent between reaching the upper tonic and beginning the *layakārī:* from 10'16 in the concert performance to 4'25.

CONCLUSIONS

Drawing on proportionality to undertake a detailed examination of what is consistent and what differs between otherwise comparable performances is one way in which this and similar studies might be used. The study provides a baseline understanding of a proportional template against which individual decisions and processes, influenced by a broad range of constraints and contingencies, such as duration of performance, interactions with co-performers, minutiae of *rāga* grammar, and vocal range might be enacted. However, more immediate observations have been drawn from the data, as summarized below.

Both genres, *dhrupad* and *khayāl,* exhibit consistent proportions: the reaching of the upper tonic as a proportion of the *ālāp* prior to rhythmic intensification, and as a proportion of the whole, and the point of rhythmic intensification as a proportion of the whole. Though there were significant differences between the two genres with respect to both the reaching of the tonic and the beginning of rhythmic intensification as proportion of the whole, intra-genre consistency did not differ between genres, reflecting greater emphasis on rhythmic elaboration in *dhrupad*. This demonstrates that the flexibility associated with *khayāl* is not reflected in the proportions produced in performance, hinting that whatever processes may be responsible for consistency of proportion may not be dependent on genre.[19] In both genres, the length of performance generally does not influence the proportions, though longer *khayāl* exhibit greater flexibility in the proportions of the first part of the performance.

These findings and this approach can be used to examine consistency or flexibility on the part of individual singers, or within stylistic groupings (the *bānīs* of *dhrupad* and the *gharānās* of *khayāl)* and to assess proportionality as a feature of the distinctive style of individual performers. Patterns of consistency are found at both the level of stylistic lineage and for individual singers, though unsurprisingly, some singers are more flexible than others. The findings also show proportional comparability between sound-objects produced by individual singers under varying circumstances.

This empirical base in turn leads to several suggestions that may be productive in further etic analyses of Hindustani classical performance. It may also, in conjunction with detailed ethnographic work with performers, offer emic insights of analysis and 'planning'. I had initially approached this study with a strong interest not only in proportion, but also in the direction of performance: the powerful intensification effected through increase in pitch, speed, rhythmic articulation, and volume. Of these, I considered only the first truly teleological, as there was a clear goal in the upper tonic, whereas such a specific goal is not possible in the other parameters, which can only truly be relative. What I did not anticipate was that the most consistent proportion across performances as a whole, across genres, and across performances by individual singers would be that of this goal to the point at which the *layakārī* or *joṛ* commences, rather than of this goal to the performance as a whole. Primarily, regardless of genre, performances have a bipartite structure, defined by the point of rhythmic intensification: what the consistency of teleologic proportionality of the first part of that structure reminds us of is the cross-genre importance of that structure itself.

This suggests two ways of conceiving the demonstrated proportionality of performances. The *primary* one, because the second depends on this, is a *structural* proportionality *rāgālāp-joṛ* or *rupakālāp-layakārī.* To make a point of comparison, the structural division clearly heard in *dhrupad* between *rāgālāp* and *joṛ* is as consistent, and thus likely as significant, though frequently less clear, in *khayāl.* The second is of this structural proportionality as a *teleologic* one – the proportionality defined by movement towards a clear goal. Thinking in these terms, not only may we note that some singers are more consistent and others more flexible, but we may also consider that such consistency is related to a sense of structure or of teleology.

Of course, even the very words that I use in this discussion may give the impression that singers think of time stretched out before them like a fixed canvas. It must be reasserted that the proportions measured here are those observed, not those planned. Casual conversations with singers stress a strong awareness of how long they might sing for as a constraint (seldom if ever enough), rather than an abstract period to be divided. Conversely, talk of planning tends to focus on general principles of development, on step-by-step planning, and on spontaneity rather than proportionality. In his work on time, Wolf (2006) discusses how specific, expected events become anchors around which other events are organized and interpreted. The key point in performance, the teleologic goal, achieves this. Audiences expect it, experience tension in the moments leading up to it, and release at the moment: the subsequent sections of performance are heard with inevitably different expectations.[20] That a relatively consistent proportionality is created by this event, and by the transition from one section to another suggests that the event might help "organize" the extensive time span of performance in audience perceptions as well. To what extent might these moments organize a singer's activity as time unfolds, as distinct from time being conceived as a fixed and sectionalized blank canvas? Having spent a certain length of time reaching key points of performance do singers "balance" this in their subsequent singing? Do singers themselves

regard as ideal or at least better performances that are proportioned in consistent ways? These questions need be pursued in studies that are more subjective, qualitative and emic. Howat (1983) writes that "proportional balance in any piece of music is something we tend to take instinctively for granted", but "it is not just the mathematical proportions themselves that matter, but also whether they are well matched to what they contain". Can such proportions be juxtaposed to the affective, referential and ideational aspects of *rāga?* The figures contained in this study are to be considered as nothing more than an overview, or an unveiling of basic proportions. To what extent these are necessary for "success" (and I must use that word advisedly because I do not wish to provide a critical evaluation of performances), may depend on some of the singular, individual, contingent and stylistic variables that rise from particular performing circumstances, preferences of individual singers, demands of particular *rāgas,* and shared and inherited stylistic approaches, all of which may determine the content. This is a possible next step.

ACKNOWLEDGEMENTS

This article was copyedited by Tanushree Agrawal and layout edited by Diana Kayser.

NOTES

[1] Correspondence can be addressed to: John Napier, University of New South Wales. E-mail: j.napier@unsw.edu.au.

[2] See Clayton (2000).

[3] It would seem that the odds of a composer's work receiving Golden Section scrutiny are reasonably good: a quick survey of published studies shows that examples range from Dufay (Sandresky 1981), through Bach (Sabatier, 1992), Mozart (Kokkonen, 1988, Perry-Camp, 1979), Chopin (Ross, 2013), Debussy (Howat, 1983), Puccini (Atlas, 2003), Satie (Adams, 1996), Bartok (most famously Lendvai, 1971), Sibelius (Jalas, 1988), Vaughan Williams (Atlas, 2010) and Webern (Post, 2007), to Xenakis (Beyer, 2013). See Kenny (2000) for a discussion of this proportion in improvised music.

[4] Henry (2002) has demonstrated that the achievement of intensity is central to a range of musical traditions across India and in adjacent countries. Intensity is achieved by strategies that include movement from "static to ecstatic", low to high, slow to fast, quiet to loud, and rhythmically free to rigid. I would add to this the movement from introvertive to extrovertive in the physicality of performers. He links the building of musical intensity to that of spiritual intensity, demonstrating that such intensification is what he calls, after Weber, a 'rational' approach to the achievement of spiritual goals. Though this is beyond the scope of my study, it points to a deep investment in this process as a feature of powerfully affecting performances, and offers justification for the empirical study of its landmarks.

[5] In some performance practices, more than one cycle will pass before this linking is made.

[6] In *khayāl* performances, the sounding of the upper tonic may be included in, or immediately followed by, a second section of the fixed composition. Though the point discussed here has been labeled "C" for "climax", there may be further climactic moments in the sections of performance examined.

[7] *Gharānās* are recognized lineages of blood and/or teaching, with concomitant identifiable stylistic approaches. Major studies include Wade (1984) and Deshpande (1985).

[8] There is some rather informal theorizing that the *khayāl ālāp* is simply a *dhrupad ālāp* made accessible by the addition of text, an underlying metre, and a cycle that provides clear signposts for the listener, both as a cycle and through the provision of a *mukhra,* a cadential phrase at the end of each cycle or two of the *tāla*. Though Butler Brown's (2010) study of the origin of the *khayāl* does not address this, the existence of this theory confirms the analogous relationship between the *ālāp* of *dhrupad* and the *rupakālāp* of *khayāl.* See also Miner 1993.

[9] One occasional quirk is that singers may break off to address the audience, usually didactically, even to offer examples. These parenthetical breaks have been excluded from the performance time so as to measure only development.

[10] This proportion is the closest one to the Golden Section – given that it is for performances as a whole, rather than for performances within a genre, and that there is the greatest dissimilarity between genres in this proportion, further investigation of Golden Section proportions is not warranted.

[11] An independent sample t-test was used to examine the difference in the mean percentage between dhrupad and *khayāl.* My thanks to Nancy Baggs for preparing these figures, and to David Angell.

[12] The reasons for this may be aesthetic – once the upper tonic has been sounded, a second ascent generates less intensity – or practical – singing the upper tonic in the *bandish* warms up the voice.

[13] There is a number of singers whose *gharānā* affiliation was unclear, or who are affiliated with more than one *gharānā,* or who are the sole representative of their *gharānā.*

[14] Deshpande (1987) refers to the 'undisciplined' nature of Bade Ghulam Ali Khan's singing, implying, particularly through his recounting of an anecdote of B.R. Deodhar, that performances 'lack order'. Certainly, this is *not* reflected in a flexible approach to the large-scale proportions by him or other members of his Patiala *gharānā* examined in this study.

[15] Jasraj and Abhyankar offer the only adequate example of a student-teacher pair of *khayāl* singers. It would be reasonable to expect that comparable levels of similarity would occur in such cases.

[16] This structural sense may be very strong. I examined three performances, of quite varying lengths, by Zia Mohiuddin Dagar. In all three, the *jor* began at 50% of the total length. The other proportions varied quite considerably.

[17] Wade (1984) cites reviewers who praise Pandit for his formal 'balance'.

[18] *Rāga* theory distinguishes between *pūrvāṅga* and *uttarāṅga rāgas,* those concentrating on the lower and upper tetrachords respectively. With this in mind I collected data on the amount of time spent before passing from the lower to the upper tetrachord in the development towards the upper tonic. The complexities of *rāga* structure make precise definition of this point difficult, and thus the data have not formed part of this study. Nevertheless, Amir Khan spends a good deal (c. 20%) longer than what may be the average in the lower tetrachord. This confirms Wade's (1984) observation that in commercial recordings he spent substantially longer in the lower register.

[19] Genre specialization is very rigid: though there may be rare exceptions *dhrupad* specialists do not perform *khayāl,* and *khayāl* specialists seldom if ever sing *dhrupad.*

[20] The climactic reaching of the upper tonic garners its force in part from what David Huron (2006) calls 'prediction responses' (listeners acquainted with the style know that this will occur), 'imagination responses' (the gratification of fulfilling the prediction is variously delayed), and perhaps from 'tension responses' (the precise approach taken by the singer or singers is unknown).

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