7. *Interobjectivity*

**Intro**

In Chapter 6 we started trying to unpack the black box of musical meaning (Figure 7-1). Ethnographic observation, reception tests and a taxonomy of VVAs led to the establishment of shared subjectivity of response, as evidence of ‘other things than just music’ that demonstrate the existence of semantic fields linked to musical structure in an analysis object (AO). Those ‘other things’ are called *paramusical fields of connotation*, or PMFCs for short. The links are not extra- but paramusical because they exist alongside or in connection with the music, as an intrinsic part of musical semiosis in a real cultural context, not as external appendages to the music.\(^1\) The VVAs in Chapter 6 — all verbalised in terms of movement, location, mood, feeling and people, all those library music titles and descriptions etc. — are intrinsically paramusical. They are essential to the establishment of PMFCs, i.e. of particular semantic fields connected to particular sets of musical sound in particular cultural contexts. Now, the PMFCs in Chapter 6 derived mainly from *intersubjective* observations of response in relation to particular structural configurations in particular pieces of music. This chapter focuses on an *interobjective* approach to musical semiosis (Figure 7-2, p.238).

*Interobjectivity* clearly has something to do with relationships between objects. It presupposes that objects consist of structural elements, and that one object can be more or less like another depending on the ele-

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\(^1\) \(\pi\alpha\varsigma\alpha\ (para) = \) beside, alongside, issuing from, etc; *extra* (Latin) = outside.
ments, if any, they share in common. Now, if any of music’s structural elements are, as we’ve argued, capable of carrying meaning we’ll need first to have some idea of what is meant by three concepts: [1] a musical object; [2] a musical structure; [3] ‘a musical structure that carries meaning’ or museme. With those working definitions behind us we’ll be able to focus more clearly on interobjective procedures.

**Basic terminology**

**Object and structure**

In the expression ‘analysis object’ (AO), object is not used in the Peircean sense (p. 156). Here it just means an identifiable piece of music in audible form, the object of analysis.² It can be a pop song, a classical symphony movement, a jingle, a film music cue, a TV theme etc., and it usually has a name or title of some sort. When used in this sense, a musical object, if stored as recorded sound, will typically occupy one CD track or constitute a single audio file. Therefore, the interobjective procedures explained later in this chapter involve the establishment of sonic relationships between an analysis object (AO) and at least one other musical object (piece, song, movement, track, etc.). The recurring proposition in interobjective analysis is that something in musical object A (the AO) sounds like something in musical object B (or C or D… or Z).

Now, that SOMETHING THAT SOUNDS LIKE… could be almost anything. It might be a turn of melodic phrase, a riff, a sonority, a rhythmic pattern, a harmonic sequence or type of chord, a particular use of particular instruments, of vocal timbre, of acoustic space, any of which could be presented at a particular speed in a particular register at a particular level of intensity and so on. Any such ‘something’, can be poetically identified as a particular configuration of different parameters of musical expression of the sort just mentioned (rhythm, pitch, timbre, etc.). It will also usually be a combination of several such ‘somethings’. It could be a particular harmonic sequence played by particular instruments using a particular rhythmic pattern, or a particular melodic turn of phrase delivered with a particular vocal timbre at a particular pitch and volume in a particular type of acoustic space towards the front, back, left, right

². Piece of music is defined on page 272.
or centre of the mix. Most of these ‘somethings’ will be short enough to fit into the extended present but they can also be processual, comprising the order and manner in which different sections (episodes) in the AO are presented, varied, extended, shortened or repeated.\textsuperscript{3}

Whatever the exact structural characteristics of the possible types of ‘something’ may be, I just used poëtic rather than aesthesis terms to exemplify those constituent aspects of a musical object, i.e. I used terms derived from the process of constructing the sounds rather from how they’re perceived as communicating anything else than themselves.\textsuperscript{4} The ‘somethings’ of the previous paragraph are in that sense qualifiable as structural because any one them can be conceptualised as a musical structure regardless of semiotic potential. Just like these words typed into my computer, written to disk and useless until they are read or heard, musical ideas also have a semiotically dormant mode of existence, whether stored as an audio recording, or as a score, or in the brain cells of individuals constituting a musical community: they are also useless until they are reproduced and heard inside the head or out loud.\textsuperscript{5} In other words, a musical structure, as a poëtically determinable entity and set of sounds in physical form, always has the potential to become a sign in Peirce’s primary trinity of semiosis.\textsuperscript{6} In that case its status as sign presupposes that the structural entity materialises an initial idea or intention, and, more importantly, that it’s linked to an interpretant. If such a structure is not considered semiotically it remains just that —a mere structure— but if it’s considered along with intended or perceived meaning it also becomes a sign, a structural item of musical signification. A structural item with semiotic properties in music will be called a MUSEME. If only things were that simple...

\begin{enumerate}
\item See Glossary and pp. 272-273 for explanation of the extended present. Parameters of musical expression are discussed in Chapters 8-12.
\item For explanation of poëtic and aesthesis, see Glossary and p.115, ff.
\item This dormant state can be compared to a parked car. To be of any use as a vehicle, it has to be designed, its parts produced and assembled. You have to know how to drive it, but unless you’re a mechanic, you won’t think of the car in the same way as those who made it. Parked motionless it still exists and can be thought of as a physical object as well as of in terms of its potential uses.
\item Peirce’s primary trinity: ‘object’, sign, interpretant (pp. 156-158). Please note that I’m not using object here in the Peircean sense.
\end{enumerate}
**Museme**

The term *museme* was coined by Charles Seeger (1960:76).7

[It is a] ‘unit of three components — three tone beats— [which] can constitute two progressions and meet the requirements for a complete, independent unit of music-logical form or mood in both direction and extension…. It can be regarded as… a musical morpheme or museme.’

The last part of this statement is clear enough: if a morpheme is the smallest linguistic unit that has meaning in and of itself then a museme is the smallest unit embodying meaning in music.8 If that is so, Seeger’s explanation of the term is problematic for several reasons.

*Tone*, as in ‘tone beat’, is the first problem with Seeger’s definition of *museme*. If *tone* means a note of discernible fundamental pitch, then a musical structure consisting of three notes *without* discernible fundamental pitch, as in a drum pattern, would have no ‘music-logical form or mood’ and would carry no meaning. Since that conclusion is both false and an insult to drummers let’s assume that Seeger meant ‘three *notes’*, using *note* in the MIDI sense of the word, i.e. a single, discrete *sound* of finite duration in a piece of music, whether or not the sound is tonal.9 At least that definition caters for the connotative distinction most Western listeners are capable of making between, say, a symphonic timpani roll and a FUNKY DRUMMER loop. It would also let us use the term museme to ‘horizontally’ identify meaningful units of rhythmic and melodic structuration, i.e. in terms of at least three consecutive notes and to think about such unlayered musemes as constituent elements in single-strand units of musical meaning — *museme strings* —, as evidenced in musical motifs, phrases, ostinato patterns or riffs, etc.10 So far, so good. The trouble is that musical meaning is not solely dependent on note *sequences* (the diachronic, ‘horizontal’ aspect). It is, as we’ll

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7. Seeger (1886-1979), US composer/musicologist, and father of Pete and Peggy, took pioneering steps to bridge the gap between musicology and other disciplines.
8. See Glossary for explanations of *morpheme* and *phoneme*.
9. See pp. 273-276 and Glossary for explanation of *note, pitch, tone* and *tonal*.
10. Seeger’s AT LEAST THREE NOTES rule, questioned on page 235, is perhaps better understood as an AT LEAST TWO CHANGES rule because: [1] the change from musical silence to note at the start of a piece or after a pause is also (quelle surprise!) a musical change; [2] the final note of a single-strand museme is often elided into the first note of the subsequent single-strand museme (Tagg, 1982:54-58).
see, at least as much a matter of simultaneous layering (the synchronic, ‘vertical’ aspect) of notes.11

This is neither the time nor place to discuss the epistemological background to Seeger’s pioneering ideas about musical meaning, except to say that its problems may derive partly from the type of linguistic theory circulating in his day, partly from conventional musicology’s fixation with narrative form (diataxis) and an apparent reluctance to deal with semantics or pragmatics.12 Many linguists have since Seeger’s day argued that prosodic aspects of speech —timbre, diction, intonation, volume, facial expression, gesture, etc.— are semiotically at least as important as the words they accompany.13 If such layering of sonic structuration is important to the mediation of meaning in speech, it’s absolutely essential and intrinsic to music because notes cannot exist without the sound carrying them, be that sound and its note[s] imagined inside your head or heard out loud. To put it in simple terms from the musician’s standpoint, the sound you put with the notes —how you play or sing them— is semiotically at least as important as the notes you put with your sound. Neither can exist as music without the other and, when it comes to musical signs, the how (notes or sound) is inevitably an intrinsic and inseparable part of the what (sound or notes). These ideas may become clearer with a bit of concretisation.

The two statements DON’T WORRY ABOUT ME said nonchalantly and DON’T WORRY ABOUT ME spoken with bitter resentment14 quite clearly send no more the same message than do the first line of your national anthem played by a professional symphony orchestra accompanying a

12. See pp.145-148 under ‘Semio’ in Chapter 4; see also Chapter 11 (p. 383, ff.).
13. Like other scholars of his time who sought to explain how music relates to other symbolic systems (e.g. Nettl (1958), Bright (1963)), Seeger referred to linguistic models that still accorded semiotic primacy to the written word, to denotation and to the arbitrary sign. Such attempts to align meaningful elements in music with those of language were subsequently criticised by musicologists (e.g. Nattiez (1975, 1987), Imberty (1976, 1979), Lerdahl & Jackendoff (1977) and Keiler (1978))). Among representatives of more recent linguistic theory are Bolinger (1989), Cruse (1988), Eco (1990) and Kress (1993).
14. See p. 345 ff. for more on prosodic meanings of ‘Don’t worry about me’.
large chorus of trained voices and the same passage sung out of tune, with the wrong words, by someone with a foreign accent accompanied by two drunks mistreating a concertina and a battered old acoustic guitar. Of course, the difference between the first three sung notes of one national anthem and another is semiotically significant, however they are performed, because that difference allows listeners to musically distinguish one nation from the other during, say, TV coverage of the Olympics. That said, the way those notes are sounded is at least as important, for while the symphony orchestra version of your national anthem may well be heard in terms of national pride and dignity, the foreign drunks are more likely to come across as disrespectful, as performing a musical equivalent to burning the flag. That cardinal difference between pride and ridicule is just as much a matter of musical structure (volume, timbre, instrumentation, intonation, accentuation, phrasing, etc.) as the notes (pitch and rhythm profile) telling us which nation’s patriotism is being extolled or dragged through a dung heap. All such structures and their connotations are in other words determined by different use of music’s various parameters of expression as well as, of course, by culturally specific conventions of musical perception and interpretation.

Now, assuming, at least for the time being, that museme means a minimal unit of musical meaning, it could be argued that the first notes in the tune of the Star Spangled Banner and of the Marseillaise each constitute a museme if neither of them can, as a sequence of notes producing a particular profile of rhythm and pitch, be broken down into smaller units that carry any meaning in themselves. But it would also imply that the OFFICIAL SYMPHONY and RAUCOUS DRUNKS renderings of those two national anthems mean the same thing. That would be absurd because

15. For example, the first three notes of the tune in the chorus of Granada (Lara, 1932) are identical to those at the start of the Marseillaise (three sprightly notes, all on the fifth). Both have a stirring ABOUT TO GET UP AND GO/ALLONS, ENFANTS! character followed by a rising melodic line. If this particular set of three notes can occur with the same sort of effect in at least two different pieces of music conceived within the same general musical idiom (The Marseillaise and Granada), and if it cannot be broken down into smaller meaningful units, i.e. if the link between the musical structure and its interpretant is consistent and repeatable inside the same broad musical-cultural tradition, then it’s clearly qualifiable as a minimal unit of musical meaning.
both versions of the two national anthems clearly contain other structural elements that semiotically link not to France or the USA but to interpretants which can be referred to in terms like patriotic pride and national ridicule respectively, regardless of which nation is the object of eulogy or derision. Moreover, both those types of ‘other’ musical sign can be broken down into smaller meaningful units, for example what the symphony orchestra’s string section plays on its own, or the sound of the drunk’s concertina without the raspy foreign vocals. And even those smaller but musically meaningful units may in their turn be reducible to yet smaller meaningful entities until the point where only one meaningful note is left, like the single-note museme struck on tubular bell at 0:04 in the title music for Monty Python’s Flying Circus.16

If a museme can consist of as little as one single note, Seeger’s three-note criterion for qualification as a museme doesn’t work. Indeed, a one-note museme can exist because its semiotic charge relies more (though not exclusively) on how it’s constructed ‘vertically’ —by the way it’s struck on which instrument at which volume over which chord played by which other instrument[s] in which register in which tonal idiom and so on— than on its immediate ‘horizontal’ context (by its relation to whatever precedes and follows it).17 This clearly means that explanations of musical semiosis need to consider several individually meaningful layers that sound simultaneously but which do not necessarily occupy the same duration as each other. These composite layers of simultaneously sounding musemes are called MUSEME STACKS and constitute ‘now-sound form’ or SYNCRISIS (Chapter 12). They’re particularly useful when forming hypotheses about which structural elements in an AO may be linked to which sort of interpretants.

Returning to the initial melodic notes of your national anthem performed in two different ways, Table 7-1 (p.236) identifies the first museme (1a) as the first part of its first melodic line (e.g. the ‘ALLONS, ENFANTS’ part of ‘ALLONS, ENFANTS DE LA PATRIE’ in the Marseillaise, or just the ‘OH, SAY’ bit of ‘OH, SAY, CAN YOU HEAR?’ at the start of The Star Spangled Banner) in both the symphonic (A) and drunk (B) versions.18

16. See TLTT: 413-414 for further discussion of that single-note museme.
17. See the note parameters of MIDI code in footnote 9, p.232.
As suggested above, the most obvious interpretant for museme 1 in both versions is the official identity of the nation in question. Museme 2, on the other hand, is actually a museme stack (or syncrisis) consisting of three constituent musemes for version A (2a-2c) and five for version B (2a-2e), some of which can in their turn also be understood as subsidiary museme stacks broken down into yet more constituent musematic entities. That sort of musematic hierarchy is illustrated by museme 2 in the B section of Table 7-1 and can be explained as follows.

Table 7-1: National anthem musemes: symphony orchestra and foreign drunks

<table>
<thead>
<tr>
<th>Museme</th>
<th>Museme Sign Designation</th>
<th>Feasible Interpretants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Symphony orchestra and chorus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>First part of first melodic line</td>
<td>My national identity</td>
</tr>
<tr>
<td>2a</td>
<td>Professional symphony orchestra in classical vein.</td>
<td>Official, organised, ‘classical’, quality, polished, dignified, impressive, etc.</td>
</tr>
<tr>
<td>2b</td>
<td>Professional chorus</td>
<td>As 2a + large collective, synchronised individuals, common goal</td>
</tr>
<tr>
<td>2c</td>
<td>Big concert hall with long reverb time</td>
<td>Large official venue, space for lots of people and a big sound</td>
</tr>
<tr>
<td>1+2</td>
<td><strong>TOTAL</strong> = The nation, its values and institutions are big, strong, honourable, etc. I may be small but I am proud to be one of its citizens. United we stand, I belong. Together we are just great.</td>
<td></td>
</tr>
<tr>
<td><strong>B. Foreign drunk singing in a pub</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>First part of first melodic line</td>
<td>My national identity</td>
</tr>
<tr>
<td>2a</td>
<td>Single foreign vocalist</td>
<td>Not one of ‘us’, alien, inappropriate; just one person</td>
</tr>
<tr>
<td>2b</td>
<td>Raspy voice</td>
<td>Unpolished, crude, unsophisticated</td>
</tr>
<tr>
<td>2c (stack)</td>
<td>Out-of-tune guitar&lt;br&gt;Simple irregular strum&lt;br&gt;Simplified chords&lt;br&gt;Concertina (diatonic)&lt;br&gt;Background noise: glasses, chatter, raucous laughter</td>
<td>Unpolished, unofficial, careless, messy, disrespectful; popular portable sound for parties or camp fires&lt;br&gt;Simple, portable, old-time, proletarian&lt;br&gt;Disrespectful, inappropriate</td>
</tr>
<tr>
<td>1+2</td>
<td><strong>TOTAL</strong> = Either the nation, its citizens, its values and institutions are being vilely ridiculed and demeaned; or the bloated pomp and arrogance of those running my country is being rightly debunked.</td>
<td></td>
</tr>
</tbody>
</table>

18. Museme 1b would have been the ‘de la patrie’ and ‘[say,] can you hear?’ parts of the first melodic line in the *Marseillaise* and the US national anthem respectively. The ‘SAY’ note in *The Star Spangled Banner* is elided and part of both musemes 1a and 1b. For an explanation of elision in museme strings, see Tagg (2000a:107).
The single foreign vocalist (museme 2a) does not represent the same thing as his raspy voice (2b) because a raspy foreign voice, a raspy native voice, a well-trained native voice and a well-trained foreign voice all sound different and embody four different interpretants. Nor do either museme 2a or 2b mean the same thing as the out-of-tune guitar strummed irregularly with simplified chords (2c) which, in its turn does not have the same effect on its own as the concertina without the guitar (2d). The total effect of these constituent musemes would also be slightly but significantly different without the background noise of museme 2e. Moreover, museme 2c (guitar) contains three subsidiary structural elements, each of which contributes to its overall meaning: it isn’t properly tuned (2c1); it’s strummed simply and irregularly (2c2); and the chords played on it are much more rudimentary than in an official version of the same piece (2c3). Alter or remove any of those three structural elements and both the overall structure and probable interpretants of museme 2c change too. Finally, add museme 1 to the equation and you have quite a complex museme stack capable of generating, inside a mere second or so, the two radically different sets of interpretants (PMFCs) shown at the bottom of each section in Table 7-1. To quote Mendelssohn again:

‘The thoughts which are expressed to me by a piece of music... are not too indefinite to be put into words, but on the contrary too definite.’\(^\text{19}\)

Although this discussion of the term *museme* will have hopefully provided a few insights into how musical signs may be constructed, identified and deconstructed, I’ve given the term no conclusive definition, simply because I can’t. It would after all be foolhardy to try and distil the theoretical essence of *museme* without providing much more extensive evidence of how the construction (poïesis) and reception (aesthesis) of individual musical structures are demonstrably and systematically linked to things other than themselves within the same broad music culture. Initial steps in the investigation of those links

\(^{19}\) Felix Mendelssohn (1809-47), quoted by Cooke (1959: 6). I’ve intentionally misquoted Mendelssohn this time because the words ‘which I love’ have been replaced by an ellipsis (‘…’). The words appear correctly on page 171.
were suggested in Chapter 6—‘Intersubjectivity’. Still, we are now, after discussing the terms object, structure and museme, in a better position to expand analytical method into the realm of interobjectivity as we seek to identify and interpret structural elements that carry musical meaning, be they musemes, museme stacks or museme strings.

**Interobjective comparison**

Fig. 7-2. The alogogenic ‘black box’: two escape routes

If procedures establishing *shared similarity of response* to music between several human *subjects* are called *intersubjective* (vertical arrow on the left in Figure 7-2), then those establishing *shared similarity of structure* between two or more musical objects can be called *interobjective*. Interobjective procedure is *interlexical*. It first entails finding *structural elements in other music that sound like structural elements in the AO*. That process of establishing musical intertextuality is called *interobjective comparison*. The ‘other music’ containing structural resemblance to the AO is called *interobjective comparison material* or IOCM for short. That type of *SOUNDS-LIKE* link is represented in Figure 7-2 by the horizontal arrow (*structural similarity*) between the AO and the IOCM.

Now, it may seem odd to suggest that referring to other music can help us escape from the black box of *music is music*: it’s like advocating regression into musical absolutism and to the notion that music refers
only to itself. That’s why it’s essential to understand that interobjective comparison is only the \textit{first of two steps} in a procedure relating the AO to the PMFCs appearing bottom right in Figure 7-2. Interobjective comparison simply exploits the non-antagonistic contradiction between music’s intra- and extrageneric characteristics, combining the potential of both. Considering first the intrageneric aspect, it’s worth recalling part of the second tenet in Chapter 2’s definition section.

‘[M]usical structures often seem to be objectively related to either: [a] their occurrence in similar guise in other music; or [b] their own context within the piece of music in which they (already) occur.’

As shown in Figure 7-2, interobjective comparison exploits this intrageneric side of the contradiction as a \textit{first step} (horizontal arrow AO-IOCM) in opening up a \textit{second} store of paramusical information (vertical arrow between IOCM and PMFC to the right in the diagram). A fictional example may help concretise this line of thinking.

Let’s say your AO is a short extract of film music containing sounds reminiscent of a library music piece called \textit{Mysteries of the Lake}. Since that piece sounds, in part or whole, like your AO, you can assume it shares sonic structural traits in common with your AO. If that is so, the library music piece qualifies as potential \textit{interobjective comparison material} —IOCM— linked to the AO by the ‘structural similarity’ arrow in Figure 7-2. At the same time, the library music piece’s suggestive title, \textit{Mysteries of the Lake}, is an obvious hint at a paramusical field of connotation (PMFC) belonging to that piece of IOCM (step 2, vertical arrow on right in Figure 7-2). Noting also that library music company staff characterise the same piece as \textit{eerie} and \textit{icy} (also step 2), it’s possible to summarise the piece’s PMFCs so far as \textit{mystery, lake, eerie, icy}. The point of this simple two-step process is that if, as in this fictional instance, the concepts \textit{mystery, lake, eerie} and \textit{icy} are linked to music sounding like something in your AO, then it’s conceivable that those paramusical concepts may also apply to the AO, in short that your extract of film music may be linked to a PMFC embodying notions of \textit{mystery, lake, eerie} and \textit{icy}. That is at least by no means unreasonable as a hypothesis. The only trouble is that one swallow doesn’t make a summer, or, less poetically, that one single piece of IOCM and its connota-
tions do not prove that the relevant sounds in the original AO actually connote whatever MYSTERY, LAKE, EERIE and ICY together create by way of a PMFC.

There are several ways of verifying or falsifying individual occurrences of paramusical connotation deduced through interobjective comparison. One way is to use the sort of reception tests discussed in Chapter 6 to check if the VVAs they produce (the vertical arrow of intersubjectivity in Figure 7-2) show any consistency with those deduced using IOCM. Put simply, do the two sets of PMFC at the bottom of the diagram match up? If, for instance, staying with the MYSTERY LAKE example, reception test respondents associate to not just MYSTERY, LAKE, EERIE and ICY but also to things like SWIRLING MIST, DARK FOREST and MEDIEVAL MYTH, all well and good; but if responses include significant amounts of, say, SUNSHINE, AIRPORTS, FASHION SHOWS, HAPPINESS and COWBOYS you’ll need to think again. But there are other ways of testing initial hypotheses of paramusical connotation.

The more instances of interobjective similarity you find, the better your chances will be of finding PMFCs relevant to your AO and of examining degrees of consistency between the PMFCs to all those different pieces of IOCM. For example, still using the fictional MYSTERY LAKE AO, the more IOCM you find connected to PMFCs like MYSTERY, LAKE, EERIE, ICY, SWIRLING MIST, DARK FOREST and MEDIEVAL MYTH, the more plausible your initial hypothesis will be. On the other hand, perhaps LAKE only occurs in conjunction with your initial piece of IOCM and with none of the others whose PMFCs veer more towards, say, MIST, MYTH, MEDIEVAL, LORD OF THE RINGS or HARRY POTTER. If so, you might have to tweak your initial hypothesis, that is unless your respondents mention, or you find IOCM linked to, particular medieval myth elements like MERLIN, KING ARTHUR or EXCALIBUR, in which case LAKE (as in ‘the lady of the lake’) would still be significant. Of course, in the unlikely event of other IOCM being connected to PMFCs verbalisable in terms like SUNSHINE, AIRPORTS, FASHION SHOWS, HAPPINESS and COWBOYS, you’d either have to abandon the initial hypothesis or to check how much those HAPPY SUNSHINE AIRPORT pieces of IOCM actually resemble your AO in musical-

20. See also ‘Reverse engineering 1’ and ‘2’ (p.249, p.251).
You might also need to ask if the HAPPY SUNSHINE AIRPORT pieces are conceived in the same broad set of musical idioms as the film music cue whose ‘message’ you’re trying to explain in words. The collection of IOCM necessary for the sort of procedure just sketched can seem like a daunting task, especially if you aren’t a musicologist or practising musician. There are three practical ways, explained next, of overcoming this difficulty: ASK A MUSICIAN (with caveat), DIGITAL RECOMMENDERS and REVERSE ENGINEERING.

Collecting IOCM

1. Ask a musician

One of the distinct advantages of interobjective comparison is that it treats music as music. Putting not too fine a point on it, you could say that it uses (other) music as a sort of direct metalanguage for music. The only trouble is that (verbal) language trumps all other sign systems in our tradition of knowledge and that IOCM can only be used as a first step in the semiotic analysis of music. That said, the direct structural intertextuality of interobjective comparison can, as we shall see, produce valid insights about the meaning of an AO. Musicians (instrumentalists, composers, singers, studio engineers, etc.) are very useful when it comes to tracking down IOCM because of their audio-muscular memory.

Fig. 7-3. Numerical keypads

One way of conceptualising muscular memory (without the audio) is to imagine you’re at a cash machine and to tap your PIN code on the nearest flat surface. You probably have a spatial-kinetic-tactile memory of your code reinforced each time you withdraw cash and you would, if your PIN includes other numbers than 4, 5, 6 and 0, be confused if numbers 1-9 were arranged as shown on the left (A) of Figure 7-3 because muscular memory of your PIN is based on layout B. You may even remember the gestural pattern of the phone numbers you most often call and I bet, if you’re not French and you’re confronted with a French

21. You might also, as we’ll shortly see, have to check if the HAPPY SUNNY AIRPORT pieces of IOCM are conceived in the same broad musical idiom as your AO.
computer keyboard, that you’ll curse every time you need to type A, M, Q, W or Z because your hands and fingers are used to making patterns on a QWERTY, not AZERTY, keyboard. And what is more annoying than a new DVD player or TV whose remote control buttons are placed differently to those on your old remote so that the setup menu appears when your fingers press where the mute button used to be or the TV changes channel instead of turning down the volume? In these cases you simply recall and unconsciously repeat hand and finger movements that are reinforced by the rewards they regularly produce — money from the cash machine, phone contact with your nearest and dearest, your own words on the computer monitor, TV adverts with no sound, etc.

It’s very similar with musicians and their physical relation to the sounds they’ve learnt to produce. To illustrate this point in teaching situations I often ask keyboard players in the class to ‘give me an octave’ on the nearest available flat surface. Regardless of hand size, they infallibly present a hand shape spanning just over 16 cm between the points at which thumb and small finger touch the flat surface. The audio aspect of muscular memory is even clearer in the case of cover band musicians who start work on a song they don’t know by playing along with a recording of the original version (direct audio-gestural mimicking of the relevant parts). Another example of the phenomenon is when musicians trying to transcribe what they hear use gestural patterns peculiar to their instrument to check that they’re hearing the music correctly. Even if they produce no audible sound, they hope that their gestures will correspond to what they hear in their head.

Air guitar provides another illustration of audio-muscular memory at work in music. As the Virtual Air Guitar project website puts it, ‘you don’t really need to know anything about guitar solos, except for how rock guitarists perform on stage’. The project team, like conventional air guitarists, have observed and mimicked particular gestural patterns

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22. The octave span of most piano keyboards is 164–165 mm.
23. As a student attending aural training sessions at Cambridge in the 1960s I noticed a cellist sliding her hand up and down the neck of her imaginary instrument and a horn player pursing his lips in different ways to find the right notes to put down on paper. As a keyboard player, I found myself doodling with hands and fingers to make the shapes and patterns I thought might produce the sounds I was hearing.
in conjunction with particular rock guitar sounds; but they have then reversed the process so that particular gestures trigger particular sorts of sound without the performer having to play any instrument at all.24 These examples of audio-muscular memory, not to mention the practice of speech shadowing and its implications for music making,25 illustrate that hearing musical structures is intimately linked with gesture producing those sounds and that this connection almost never involves verbal reasoning for it to work. Exploiting this phenomenon makes the collection of IOCM more direct and more efficient.

Let’s say you’ve identified a snippet of music in your AO whose connotations you want to investigate. All you need do is to ask musicians if they’ve ever before played (or sung, or composed, etc.26) anything like that snippet and, if so, in what other piece of music it occurs. The musicians you ask will usually be able to recall and create or imagine a gesture that produces something resembling the musical structure in question. If they are able to isolate and identify that structure, they may even be able to imagine it in other pieces of music, perhaps a bit higher or lower, or a bit faster or slower, with a different ‘before’ or ‘after’, maybe in a different key or on a different instrument, or, if sung, with different words, etc., etc. In any case, that’s how I work to find my own IOCM and if I’m unable to come up with anything because I’m unfamiliar with repertoire relevant to the snippet or sound in question, I’ll not hesitate to contact those who know it better and to ask them instead. For example, I’ve never been a brass player and I needed to test my gut feeling that the horn whoops in the theme for the 1970s TV series Kojak were heroic. That’s why I asked a friend who played French horn in the local symphony orchestra to tell me if, and if so where, he’d played such whoops before. He immediately came up with licks from Richard Strauss’s Ein Heldenleben and the Haupttema des Mannes from Don Juan, as well as with the main Star Wars theme — all highly heroic.27

25. Speech shadowing: repeating speech immediately (c. 200 ms) after hearing it (average delay duration of a speech syllable); see Wikipedia quoting Marslen-Wilson (1973) ‘Linguistic structure and speech shadowing at very short latencies’ in Nature, (5417):522-3; see also WORKING MEMORY and PHONOLOGICAL LOOP (pp. 272-273).
26. You could add ‘or conducted, or recorded’ to the list because both conductors and recording engineers use particular gestures to produce particular musical effects.
The great advantage of interobjective comparison is that it bypasses the frustrating exercise of trying to describe music in words. It arrives at its approximate verbal hints of musical meaning (the PMFCs lower right in Figure 7-2, p.238) interobjectively, i.e. primarily through demonstrable musical-structural connection. The second step linking the IOCM to its verbally denotable PMFCs is merely a matter of registering previously established connections between particular musical structures and particular words (e.g. titles, lyrics), or particular types of people, action, space, energy, location, mood, movement and so on (PMFCs on right in Figure 7-2). Such patterns are of course culturally specific and warrant an important caveat.

Caveat

Since the notion of music as a ‘universal language’ is so dubious (pp.47-50), sounds like connections of the sort just described should as a rule be made using only IOCM that is part of the same broad music culture as that of the AO. Just as, say, the morpheme [wi:] can, depending on various cultural factors, be understood as we, oui, wee, Wii or weee!, the same melodic figure or instrumental sound or textural sonority is unlikely to have the same connotative charge in, for instance, bebop jazz, rap, Italian opera and Balinese gamelan music.28 Therefore, if the sound, whose connotations you guess to be, say, ‘weird’, is from a recent computer game, then the eerie, icy Mysteries of the Lake library music piece could well be relevant; but if the AO is a piece of traditional court music from Cambodia it would almost certainly not.29

28. For more on this issue, see Tagg (2000a: 112-114). See also under Codal incompetence in this book (pp.179-182), especially about ‘dissonance’ in film music and Bulgarian harvest songs. Even the simple pronoun we can on its own carry a range of meanings, for example: [1] ‘we’ll arrive on Tuesday’ (normal); [2] ‘in Chapter 6 we saw…’ (author’s imagined collusion with readers); [3] ‘how are we this morning?’ (medical staff patronising a patient); [4] ‘we are not amused’ (Queen Victoria’s royal we), etc. As for [Wi]: [1] oui is French for yes; [2] wee is Scottish English for small; [3] the verb to wee is often used in English motherese instead of piss or pee (urinate); [4] Wii is Nintendo’s gaming console; [5] weee! is a childlike interjection of giddy delight.
29. Try, for example, ‘Roeung Tipp Sangvar’ (Sam-Ang Sam, 1999).
The sort of cultural incompatibility just alluded to can occur when a musician you’ve asked to provide IOCM, having first managed to reproduce the musical structure whose connotative charge you’re investigating, then places that structure in a musical context irrelevant to the broad music culture to which your AO and its listeners belong. For example, I remember hearing something resembling the hook line of an Abba song in an orchestral work by Bartók. Although the hand shape and movement required to produce (poësis) both the Abba and the Bartók snippets are quite similar they just don’t sound the same. This aesthetic impression (not sounding the same) is due partly to differences between the tonal, orchestral and rhythmic contexts of the AO (Abba) and the potential IOCM (Bartók), partly to the fact that Abba and Bartók audiences tend more often than not to inhabit different sociocultural spaces. Although this meant I had to discard the Bartók reference in my discussion of the Abba hook line, it did seem right to use IOCM from the classical and Romantic periods in the euroclassical tradition, as well as twentieth-century popular song from Europe, North America and Latin America because: [1] the AO itself belonged to the same broad musical culture as those repertoires; [2] those musical idioms were not unfamiliar to Abba listeners in Sweden in the mid 1970s.30

This issue of locating IOCM in relevant musical contexts is, as we’ll see later, a matter of precision about parameters of musical expression — the same tune played first on cathedral organ, then on kazoo will not sound the same and does not produce the same effect, so to speak. This means that the same structure with a different ‘before’ and ‘after’, in a different metre, with different instrumentation, etc., etc. cannot be ex-

30. I’m referring to the tritone motif in Abba’s Fernando (1975; Tagg, 2000b: 50,ff.) and the tritone figure in the last movement of Bartók’s Concerto for Orchestra (1943). Among the pieces of IOCM culturally relevant to the Abba motif were Swedish Rhapsody (Alfvén, 1903), O sole mio (Capua, 1898), an aria from Bach’s Matthew Passion (1727), You’ve Lost That Lovin’ Feelin’ (Righteous Brothers, 1964), and Quizás Quizás Quizás (Farrés, 1947). All those pieces are from a broad range of repertoires familiar enough to Abba listeners in the late twentieth century. I should add that many individuals, including myself, inhabit both the Abba and Bartók spheres but that we are in this respect more likely the exception than the rule.
pected to sound the same, let alone produce the same effect. As the Abba-Bartók incident suggests, a poïetically determined musical element in one piece, isolated and repeated with slight variations in the hopes of discovering IOCM, is by definition decontextualised: it assumes the quasi-autonomous status of poïetic structure in a dormant state and nothing else. That is clearly unsatisfactory if the aim of semiotic music analysis is, however tautological it may sound, to explain musical semiosis because that in its turn demands the existence of a musematic link between sign (the sonically concrete encoded part of the process) and musical or paramusical interpretant (whatever is decoded from the sign). This implies that a meaningful musical structure — a museme, a museme stack or museme string — should ideally be denotable in aesthetic as well as poïetic terms. The trouble is, as we saw in Chapter 3, that structural descriptors are, in Western institutions of musical learning, overwhelmingly poïetic, aesthetic descriptors much rarer and more vernacular. It’s for this reason essential, especially if using musicians to track down IOCM, to be aware of the poïetic risks involved in the process, even though instances of musically or culturally incompatible references are thankfully rare. But there other solutions to the problems of identifying musical signs in your AO and of collecting pieces of IOCM that contain such signs.

**Recommender systems**

Digital music recommender systems like iTunes, Last.fm and Pandora have been under development since 2000 and can be a useful starting point when hunting for IOCM, as long as their limitations are understood. These systems are currently designed to make money in various ways by using music you already listen to as a basis for suggesting similar music they might be able to sell you. *iTunes*, for example, takes ratings from your playlists and compares those with ratings given by other *iTunes* users. By identifying and cross-referencing your tastes in

31. For explanation and discussion of *poïetic* and *aesthetic*, see Chapter 3 under ‘Structural denotation’ (pp.115-120),
32. See discussion of ‘minor major nine chord’ v. ‘spy chord’ (p.116) and of Van Eyck’s *Arnolfini* marriage portrait (p.117).
this way, iTunes tries to predict what else you might like to hear or buy. Last.fm works in a similar way. However, instead of using ratings, the software installed by Last.fm on your computer logs every piece of music you listen to and builds up a detailed profile of your preferences. Your song log data is sent to Last.fm’s central database and cross-referenced with log data from other users listening to similar sorts of music. It’s on that basis that the system tells you what else you ‘might enjoy’.

Unlike iTunes and Last.fm, the Pandora system determines its recommendations on the basis of musical-structural traits in the music you listen to, as long as the music has already been analysed by a member of Pandora’s team of musician-scrutineers. Since the Pandora system relies on interobjective comparison (on similarities of musical structure observed by musicians) rather than on metamusical information (ratings, playlist logs, etc.), it’s hardly surprising that it currently receives so many positive online reviews as a reliable ‘sounds like’ recommender system. However, whatever the relative merits of these systems, it should be remembered that their function is not to identify and compare individual items of musical structure within a piece of music but to identify the characteristics of an entire piece with a view to selling you more pieces of music exhibiting similar characteristics. That said, these systems, particularly Pandora, ought to be able to provide you with enough titles of enough music in relevant styles that you can then test for structural similarities using your own ears.

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33. The analysis of one song/piece/track takes between 20 and 30 minutes and involves locating which of between 150 and 500 structural traits apply to the piece and to what extent (on a scale of 0-5) (see help.pandora.com [2010-10-16]). This analysis system seems, judging from information available online (e.g. en.wikipedia.org/wiki/List_of_Music_Genome_Project_attributes [2010-10-16]), to be quite exhaustive for rock, pop, jazz, rap, Country and other English-language types of popular music, less so for others. Pandora will probably become less US-Anglocentric and other music-structure-based systems will doubtless provide more sophisticated tools of analysis in the near future: see MacDorman et al. (2007), Meyers (2007), Williamson (2007).

34. Pandora is for reasons of copyright legislation currently (October 2010) only available to US residents. Nor are tune recognition apps like Shazam currently connected to any public sounds like type of ICM database (see end of footnote 33).
The more the merrier

Before continuing with other possible procedures of interobjective comparison, it’s worth emphasising the following four points.

1. The more informants you ask to provide IOCM, the more pieces of relevant IOCM you are likely to find.
2. The more pieces of relevant IOCM you find, the greater your chances will be of finding PMFCs relevant to your AO.
3. The more your IOCM structurally resembles your AO, the more reliable your argumentation will be about connections between the AO and the PMFCs linked to the IOCM.
4. The greater consistency there is between PMFCs linked to your IOCM, the clearer will be your presentation of musical meaning.

These four points are only guidelines. You just can’t expect every music analysis to involve a statistically reliable sample of informants, nor an exhaustive bank of accurate IOCM for every relevant musical structure, nor an unequivocal set of PMFCs for every piece of IOCM relating to every musical structure in your AO. But there are a few simple steps that can be taken to improve analytical reliability: one is explained in the next paragraph, two more under Reverse engineering 1 and 2 (pp.249-253) and another in the section on Commutation (p.253, ff.).

If a reception test is part of your analysis (Chapter 6), you can always ask your respondents to provide not only the sort of connotations alluded to in the instructions on page 207: you can also ask them to jot down the name of any other music, artist, composer, style or genre the test piece reminds them of. That extra information may increase the size of your IOCM and, consequently, the number of PMFCs associated with it. As mentioned earlier, a cross-check between the two sets of PMFC at the bottom of Figure 7-2 (p.238) can help verify or falsify your hypotheses about the musical meaning of your test piece (AO).

You can also switch the direction of the arrows in Figure 7-2. That gives two more useful ways of testing hypotheses about the meaning of sounds in your AO. Both procedures constitute a sort of reverse engineering by which you theoretically reconstruct sounds in your AO on the basis of PMFCs you think may be related to it. The first of these two procedures even lets you collect IOCM relevant to your AO without having to ‘ask a musician’.
Reverse engineering 1: from IOCM to AO

If you’re having trouble collecting IOCM for an AO you think communicates a certain mood or gives rise to certain connotations, you can start with that mood or with those connotations as hypotheses and try finding pieces of other music with titles, lyrics, on-screen action, moods and so on, that correspond to your hypotheses. For example, if your AO is a pop song whose lyrics recurrently include the words teen and angel, you can start by entering those words in the YouTube search box. Among countless versions of the actual song Teen Angel and innumerable episodes of the homonymous TV series, you’ll also find recordings of songs like Teenager in Love, Angel Baby, Tell Laura I Love Her, and Devil Or Angel, some of which may well contain passages sounding like something in your AO with all its TEENS and ANGELS. If that search fails to turn up anything of relevance, you can always use a search engine like Google to look for songs lyrics containing teen or angel. If you find any (you will!35), you can go to iTunes or YouTube and search by name for the relevant songs you found in Google. If the songs you find either way sound musically like your AO, you can count them as IOCM.

You can of course also use the sorts of search just explained if your AO reminds you of music by another artist or composer. Listening to short extracts from their music will soon tell you how viable any SOUNDS LIKE hunch might be. You can then check if any of the music your searches produce is linked to particular lyrics, moods, situations or audiences. If a particular extract from the music of another artist or composer bears structural resemblance to something in your AO (remembering the cultural caveat, of course), then those ‘particular lyrics, moods, situations or audiences’ become PMFCs of potential relevance to the discussion of meaning in your AO.

Hunting for IOCM does not necessarily entail online work. You can also scour your own or your friends’ music collections. In my own analysis work I often formulate hypotheses about musical meaning as keywords which I then shamelessly use to look for likely titles of CD and LP tracks of film music and pop songs, or, if appropriate, of classical

35. A search for [song lyrics teen teenager angel] produced 1,200,000 hits [100902].
Lieder, of Baroque arias, Romantic programme music and so on. I also search for the same keywords in the filename and title metadata of media files on my computer. If those searches produce results (they usually do) I then check, either aurally or in the score (if I have it), whether there’s anything in any of the pieces I manage to locate that sounds like anything in my AO. If there is, I note the location of the relevant musical structure within each of those pieces, along with the name of the piece and, if any, the piece’s publishing details. I then add the piece to my bank of IOCM.

But what if you’re having difficulties finding IOCM for an AO with no obvious verbal, visual or dramatic connections of its own? Perhaps it doesn’t even have a descriptive title. No problem, as long as you have a viable hypothesis about its PMFCs.

Let’s say that our fictitious MYSTERY LAKE AO has no title, that it’s just listed as a numbered cue on a limited edition CD for film music buffs. As long as I have a hypothesis about its mood (it’s the MYSTERIOUS LAKE) I’m not lost. In fact, having googled the search string |"library music" +mystery lake| I was able, in a couple of minutes and going no further than the first few of the 16,500 hits supposedly answering to my search string, to hear sample demos from three library music pieces corresponding well with sonic particularities in the AO.36 The IOCM I was able to locate so quickly consisted of two atmospheric synthesiser tracks called Secrets and Unseen, and a symphonic piece entitled Approaching Unknown. This third piece was described by library music staff as ‘CAUTIOUS, INTENSE, SURREAL… MOVING, OMINOUS, EMOTIONAL, SOARING… ATMOSPHERIC, HAUNTING… MYSTERIOUS, SUSPENSEFUL, APPREHENSIVE… EERIE’, [giving] ‘a sense of the UNKNOWN, APPROACHING TROU-

36. The search string |"library music" +mystery lake| means that the exact word pair library music and the single word mystery must both appear in the search results and that those also including the word lake should be presented before those that don’t. Secrets and Unseen are by Stephan Sechi, from the album Drones Vol. 2 - Mysterious in the Royalty Free Music Library (Radical A. Publishing) †royaltyfreemusiclibrary.com/cds/view/id/106. Approaching Unknown is in the MYSTERY section on the Stock Music site and is by Steve E. Williams †stockmusicsite.com/stockmusic/summary/play.cfm/sound.id.367165 [both sites 2010-08-26]. I should maybe have delved further in the Google listing and investigated, say, music for Disney’s Mystery Lake (Prod. 8201-049) or for Super Mario at the ‘mysterious lake’. I did not!
BLE, MYSTERY’ [and containing] ‘hypnotic flute, celeste, piano and harp ostinato’. No actual LAKE, admittedly, but I still thought the descriptions sounded about right, as indeed did the actual demo recording answering to those descriptions.

The point of these brief sorties into cyberspace is to show how simple it can be to find and hear music whose lyrics, title or descriptions tally with your hypothesis about what particular structural traits in your AO may be connoting. If something in the music of the piece[s] you discover through this sort of reverse engineering sounds like something in your AO, all well and good: your hypothesis is substantiated, at least in part. If not, your hypothesis might be faulty, or your IOCM might be conceived in a different musical idiom to that of your AO.

Whether you’ve ‘asked a musician’, used digital recommender systems or applied the sort of reverse engineering just described to hunt down pieces of IOCM and their PMFCs for your analysis, your findings can be cross-checked with results from the reception test you may have conducted (see Chapter 6). They can also be cross-checked using another sort of reverse engineering.

*Reverse engineering 2: recomposition*

Another control mechanism for checking the validity of the PMFCs you’ve collected intersubjectively or interobjectively, or that you’re simply putting forward as a hypothesis, is to provide musicians with a summary of your PMFCs and ask the them to come up with ideas for music they think would fit those fields of connotation. Of course, the musicians should not know the identity of your AO. The reverse arrow in this recomposition procedure goes from either of the two PMFC boxes in Figure 7-2 (p.238) up to the AO because you’re asking musicians to reconstruct the AO on the basis of its supposed connotations. The obvious point here is that if your musicians suggest structural traits similar to those of the AO, your PMFCs will have greater validity than if their suggestions don’t sound like it. There is, however, one major problem with this procedure. If your musicians can’t verbalise their suggestions in terms you understand, if you’re unable to decipher jargon like ‘a saw-tooth cluster at 110 dB with maximum distortion at 3k’ (ouch!), and if you can’t persuade them to play or record their sugges-
tions, then this type of reverse engineering won’t work. However, if you don’t stumble on this sort of problem, ‘composing back’ towards the AO from a set of PMFCs can be a very useful and convincing tool of semiotic analysis.

For example, during a postgraduate musicology seminar in Göteborg (Sweden) in the early 1980s, a psychologist from Lund told participants what a patient had said when listening to a particular piece of music under hypnosis. The instructions to the patient had been to say what the music made him/her see, like in a daydream. The seminar knew neither the identity of nor anything else about the piece of music that evoked the hypnotised patient’s associations which were recounted roughly as follows by the visiting psychologist.

‘Alone, out in the countryside on a gently sloping field or meadow near some trees at the top of the rise where there was a view of a lake and the forest on the other side’.

Using this statement as a starting point, seminar participants were asked to make a rough sketch of the sort of music they thought might have evoked such associations. The seminar’s collective sketch suggestion, which took about thirty minutes to produce, consisted of very quiet high notes sustained in the violins and a very quiet low note sustained in the cellos and basses. These two ongoing, extremely calm pitch polarities were in consonant relation to each other. A rather undecided, quiet but slightly uneasy melodic figure appeared now and again in the middle between the two pitch polarities. A solo woodwind instrument (either flute, oboe or clarinet) played smoothly, in a ‘folk’ vein, a wistful but not unpleasant tune that wandered quietly, slowly and a bit aimlessly over the rest of the barely audible static sounds.

The seminar’s quick sketch proved to correspond on many counts with the original musical stimulus — the ‘last post’ section at c. 4:20 in the slow movement from Vaughan Williams’ Pastoral Symphony (1922). This brief experiment suggests that people with some musical training are able to conceive generalities of musical structure linked to given paramusical spheres of association, not merely to perceive them. The recomposition exercise also suggested that the seminar participants and the patient from Lund made very similar connections, albeit in op-
posite directions, between specific musical structures and a specific paramusical field of connotation. The patient’s connotations and the seminar participants’ musical ideas reinforced each other.

Whichever methods of IOCM collection and PMFC verification you use, one thing is certain: the more precisely you indicate which musical-structural element[s] in the AO sound like which structural element[s] in the IOCM the more convincing your analysis will be. Besides, a musical structure can’t be treated as a sign (museme) if it isn’t also identified as a structure. This structural imperative is usually enough to make non-musos nervous, unnecessarily so, as I’ll explain under ‘Structural designation’ (p.256,ff.). First, though, I’ll present the last of the procedures (‘Commutation’) allowing you to check the validity of conclusions you may have drawn about which structural elements in your AO relate to which PMFCs.

**Commutation**

In linguistics, *commutation* means substituting one element among several in a group with something else to check if the meaning of the whole group of elements changes. For example, replacing the *U* sound /ʌ/ in southern UK English [lʌk] (*luck*) with the *oo* sound /ʊ/ in [ luk] (*look*) changes the meaning of the word, but making the same change from [bʌs] to [bus] doesn’t because [bʌs] (southern) and [bus] (northern UK English) are accepted regional variants of the same word meaning the same thing: *bus*. Commutation is useful in the analysis of musical meaning for determining which structural elements are semiotically more or less operative than others.

Returning once more to the ‘official’ and ‘drunk’ versions of your national anthem, it’s clear from the discussion of their musemes and feasible interpretants (Table 7-1, p.229) that some structural elements make for more radical differences of attitude towards your nation and its flag than do others. For example, replacing the raucous foreign voice with kazoo or exchanging the concertina for a ukelele would probably not make as much difference to the drunk version as would replacing

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the raucous foreign singer with an equally foreign classical baritone or the concertina player with a proficient pianist on a well-tuned concert grand. Similarly, it would change the character of the official version quite noticeably if even one member of the choir or orchestra were to perform their part out of time or tune, while considerably less difference of attitude toward your nation and its flag would result from a complete change of personnel from professional symphony orchestra to a proficient and well-rehearsed military band.

This sort of commutation is also called hypothetical substitution and more often than not it stays at the What if? stage. But the substitution can sometimes make you think of other music that sounds similar to the new variant you just imagined or created. That new IOCM may or may not be similar to that of your AO. If the new IOCM is different and if the PMFCs linked to it don’t align with those of your analysis object, then the structural element subjected to commutation in your AO can be considered operative in producing the PMFCs you found to be linked with your AO because changing that structural element to something else led to different music (the ‘new’ IOCM) and to different PMFCs. Conversely, if your commutation leads to the same sort of IOCM and PMFCs as those of your AO you’ll know that the element you replaced with something else was not so important in producing the PMFCs in question. An episode from an analysis class clearly illustrates this principle.

At a pop music analysis session devoted to finding IOCM for a 1990s electro-dance track I was sure I was hearing a chord shuttle resembling that under the hook lines of well-known pop tunes like My Sweet Lord, He’s So Fine and Oh Happy Day. But when I started playing along with the track I discovered it was pitched in an unusual key and that I had to force my hands and fingers into unfamiliar shapes. Luckily my students didn’t notice how much effort I had to put into making it sound like one of the most familiar chord shuttles in the pop repertoire. The

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point is that I’d had to do something that was poïetically, from my point of view as a keyboard player, quite different: it was hard to make the music sound like ‘the same thing’. The conclusion my students and I drew from that episode was that significant changes from the musician’s poïetic standpoint don’t necessarily lead to changes of musical message because the fact that I’d had to struggle at the piano made not a blind bit of semiotic difference. Further discussion ensued and, asked what structural features would have made a difference to the musical message, the students mentioned different rhythmic and accentual patterning, a distinctly slower or faster tempo, playing the chords at a noticeably different pitch, or on an detuned piano or some other instrument. We all agreed that making simple changes to rhythm, tempo, articulation and instrumentation definitely made a difference while transposing the music up or down a semitone made virtually no difference at all. By the end of the lesson we had learnt that what musicians produce usually does make a difference to the message but that the degree of semiotic difference at the receiving end doesn’t necessarily correspond to the degree of structural difference perceived by musicians at the transmitting end.

The last example of commutation procedure comes from the fictitious MYSTERY LAKE piece. Let’s say we’ve identified sounds in it that we think may somehow connote water, that none of the IOCM we found has anything aqueous among its PMFCS, and that the OCM contains none of the structural elements we’ve identified as potentially watery in the AO. We can first imagine the AO without the sounds we think may be watery (i.e. take them out and replace them with nothing). If our AO with that omission sounds more like all the IOCM whose PMFCS did not include water, then our hypothesis about the watery sounds in the AO may have some mileage. But it’s less likely to be a question of whether the structural element is itself included or omitted as a whole because its ‘water-iness’ could depend on any number or combination of factors — on volume/intensity, register, timbre, articulation, phrasing, tempo, metre, periodicity, tonal vocabulary, acoustic staging, etc. In fact it’s in conjunction with those parameters of musical expression that commutation is
most useful because we can test, at least hypothetically, how different the music would sound if the values of any (combination of) those parameters were to be changed. In short, you have to ask what if structural element $x$ is played faster, slower, higher, lower, smoother, choppier, using different notes, in waltz time, with a bossa nova groove, by strings or brass, with lots of reverb or dry, with the tune more up front or further back, without the bass line, etc., etc.?

**Structural designation**

The structural imperative in interobjective comparison, I wrote a few pages ago, is usually enough to make non-musos quite nervous. Indeed, how, you may well ask, can someone with little or no formal musical training, someone who can't tell a diminished seventh from a hole in the wall, be expected to accurately identify musical structures, especially given the predilection in conventional music studies for poïetic descriptors of structure? Well, that objection may once have had some validity but it has in my view, at least since the mid-1990s, become more of an excuse for not confronting music as sound in the study of music. In fact I think there is today very little apart from epistemic sloth and institutional inertia that prevents non-musos from accurately identifying musical structures. I state that opinion categorically because there are at least two complementary ways of confronting the issue of structural designation, neither of which involves any muso skill or jargon: time-code placement and paramusical synchronicity.

**Unequivocal timecode placement**

CD tracks, films on DVD, audio files, video files, etc. all include time-code as part of the digital recording. That timecode is either displayed or displayable on stand-alone CD and DVD players; it's also present in media playback software for computers, tablets and smartphones. As long as the piece is digitally recorded or rerecorded, the real time elapsed since the start of the piece you’re analysing is continually updated and shown as it is played. This means that you can hit the pause

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39. See under ‘Structural denotation’, p.115,ff,
button when you hear any musical event of interest and note the timing at that point. Stand-alone players (CD, DVD, MiniDisc) and normal playback software on computers and smartphones let you pinpoint events to the nearest second, standard audiovisual recording and editing applications to the nearest fraction of a second.\textsuperscript{40} Currently (2012) the best solution is to make sure you have your AO as a sound file on the computer and to open it using audio editing software. That way you can see points of relative quiet and loudness, changes in sound wave shape, etc. that make it easier to find your way around the piece, as shown in the top part of Figure 7-4 on page 258.

The top line of Figure 7-4 is a screen capture of the whole of the original 1962 version of the James Bond Theme as displayed by the audio recording and editing software I use.\textsuperscript{41} Using the line tool in an image editing application, I’ve marked up the starting points of the tune’s sections as I hear them. I can label them with vernacular terms like twangy guitar tune and spy chord because I can designate the sound I’m referring to by indicating the exact point, to the nearest second, in the tune’s timecode where that sound first occurs, for example the twangy guitar at 0:07 (for the entrance of 007 himself), the danger stabs at 1:33’ and the final spy chord at 1:40.\textsuperscript{42} Those structural designations are all accurate and unequivocal. No reader with access to the same recording can be in any doubt about the sounds I’m referring to.\textsuperscript{43}

\textsuperscript{40} Resolution is in milliseconds for audio software, in frames per second for video.
\textsuperscript{41} Steinberg WaveLab Studio. For software credits, see inside front cover. The screen dump is converted to greyscale and made less black to save on printing costs. It’s also reduced so it fits on the page. If you don’t own or can’t afford audio editing software, don’t worry: the music department at your school, college, university or local library may well have a site license for that sort of application.
\textsuperscript{42} I’m not suggesting that the timing 0:07 is intentional for the entrance of 007! For more about the famous SPY, CRIME, DANGER or DETECTIVE CHORD, see p. 116, ff.
\textsuperscript{43} The duration of the James Bond Theme at YouTube/iTunes is 1:48, not 1:45 as in Figure 7-4 (‘my’ version). This discrepancy is due to the fact that the audio file on which ‘my’ version is based is an analogue-to-digital transfer of an LP track and that I trimmed its initial and final silences to 0.6” and 1” respectively, whereas the iTunes file starts with 1.3” and ends with almost 3” of silence. This means that timings in Figure 7-4 are 0.7” (≈1”) earlier than in the iTunes file.
Fig. 7-4. Screen capture of James Bond Theme (Norman, 1962) in audio editing software display.

Screen capture of four points from VLC display of same MP3 as above.
The four small screen shots in Figure 7-4 show displays at four points in the same MP3 file of the *James Bond Theme*, this time using a freely and widely available media player. Please note that the total duration of the piece is 1:45 and that the screen shots have been taken at (a) 0:07, when, appropriately, the 007 tune is first heard; (b) 0:33, when the intro returns, not long before the brass first enters with its angular ‘danger’ tune at 0:40; (c) 1:17, a point unmarked in the top line of Figure 7-4; (d) 1:39 for the famous final spy chord. The timing 1:17 (c) marks the start of the last return of the intro, except that its up-and-down pattern only occurs once before the twangy guitar kicks in for the last time.

Simple media playback software is usually enough for simple analysis tasks but it has several drawbacks. [1] The pause button can be slow to react and you may find yourself noting timings that are a second too late. [2] Time resolution isn’t perfect and it can be difficult to start playing the music from exact points inside the recording. [3] You cannot extract individual mini-files or construct loops of particular sounds or passages you need to listen to repeatedly, or which you need to draw to the attention of those providing you with PMFCs or IOCM without them hearing what comes just before or after. [4] You cannot display enough of your AO on screen at one time to use as visual basis for a graphic score or for discussion of overall form and narrative process.

By creating an overview of your AO with precise timings of important events and its division into sections (see top of figure 7-4, p.258, and the table of musematic occurrence for Abba’s *Fernando*, p.387), you can also start referring to musical structures relatively, for example the danger loops just before the final chord, or the last five notes of the twangy guitar tune just before it repeats. It is, however, best when in doubt to provide an accurate timing so as to avoid any confusion about which sound you’re referring to.

44. VLC Media Player, see software credits inside front cover.
45. It’s unmarked in the top line of Figure 7-4 to avoid cluttering, as is the event at 1:13, the point at which dramatic brass stabs first punctuate the music’s otherwise unstoppable flow. Observations like this are important because halving the duration of passages presenting different material one after the other doubles the rate of change and can create an impression of stress and urgency.
46. *Feedback sessions* and *graphic score*, see Chapter 14 (pp.562-564, 568-572).
Paramusical synchronicity

Paramusical synchronicity sounds much fancier than what it actually means, but it’s also much shorter than its explanation which, however brief, runs as follows. If, unlike the solely audio version of the James Bond Theme, your AO features lyrics, moving images, stage action or dance, its musical structures can also be designated by referring to paramusical events occurring simultaneously with or in close proximity to those structures. Three fictitious examples will suffice to illustrate this simple technique: [1] the singer’s contented growl on the last ‘oh, baby!’ in verse 1 (at 0:31 in a pop song); [2] the distant screeching sound just before she pours poison into his whiskey (at 1:02:15 in a feature film on DVD); [3] the drum pattern that synchronises with the quick zoom-in on to the lead vocalist’s lips (at 2:20 in a music video). It’s usually advisable to supplement this type of structural indication with timecode designation to ensure that whoever reads your analysis can find the relevant musical structure in the recording without wasting time waiting for the moment to arrive.

Summary of main points

[1] Structural elements in music can be considered as either: [i] dormant structures regardless of semiotic potential; [ii] structural elements that can be shown to carry some sort of meaning — musematic structures.

[2] A museme is a minimal unit of musical meaning but it’s often more useful to consider meaningful musical units in terms of museme stacks, museme strings, or as syncrisis (Chapter 12).

[3] In addition to the intersubjective procedures described in Chapter 6, a musical analysis object (AO: an identifiable and usually nameable piece of music) can be subjected to interobjective investigation.

[4] Interobjective comparison material (IOCM) is music other than the AO that sounds like (bears structural resemblance to) the AO.

[5] The collection of IOCM is the first of two steps in the procedure of interobjective comparison. The second step involves relating the IOCM to its own paramusical fields of connotation (PMFCs).
[6] PMFCs related to the IOCM can be posited as PMFCs relating to the AO.

[7] IOCM can be collected by exploiting the audio-muscular memory of musicians. This method is direct and reliable since it is intrinsically musical, avoiding the mediation of words and using other music as a sort of initial metalanguage for the music under analysis.

[8] IOCM can also be gathered by searching for music whose title, lyrics, accompanying images, connotations, including hypotheses you may have yourself, are relevant to the AO. Online searches usually result in quick access to relevant pieces of IOCM (‘Reverse engineering 1’).

[9] Conclusions about musical meaning drawn from interobjective procedures can, if applicable, be cross-checked for viability with reception test results (see Chapter 6). They can also be verified/falsified using the techniques of recomposition (‘Reverse engineering 2’) and commutation (hypothetical substitution).

[10] Accurate structural designation is essential in interobjective analysis. Digital timecode placement and paramusical synchronicity are two simple ways in which anyone can unequivocally denote musical structures without having to use any muso jargon.