

The Value of Cognitive Models in Evaluating Solfege Systems¹

Steve Larson

Heated debates often arise in the selection of a system of solfege for college-level teaching of sight singing (and other basic musicianship skills): “When should we use syllables—if at all?”, “Should we use a movable system or fixed one?”, “Should we alter syllables to reflect chromatic inflection?”, “What about numbers?”, and (if we choose a movable system) “Should we use the same syllable for the tonic of major and minor modes or should we use different syllables?”.

This paper illustrates how models of selected solfege systems and models of relevant musical behaviors can help us make clearer and better informed answers to at least one of these questions: “Should we use the same syllable for the tonic of major and minor modes or should we use different syllables?”. (There are two common answers to this question. One answer is offered by the system called “do-based minor”—it calls the first scale degree *do* regardless of mode. The other

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is offered by a system called “la-based minor”—it calls the first scale degree of minor *la*, the first scale degree of Dorian *re*, of Phrygian *mi*, etc.) Debates on this question often lead to another: “Which solfege system requires the student to learn more syllables?”. While this may at first seem an awfully simple question, searching for a meaningful answer is a complex but illuminating process.

Proponents of la-based minor assert that one advantage of their system is that, with la-based minor, students have to learn fewer syllables. This assertion may be found in several books on music education and it is echoed in the most recent edition of the *New Grove Dictionary of Music and Musicians*.² Example 1 shows that la-based minor uses the same seven syllables for the major scales that it uses for the natural minor scales. But do-based minor uses different syllables for major than it uses for minor. Since do-based minor uses three additional syllables (*me*, *le*, and *te*), it uses ten syllables where la-based minor uses only seven.

If we decide to choose the solfege system that uses the fewest number of syllables for singing scales, then we choose la-based minor over do-based minor by a “vote” of seven vs. ten.

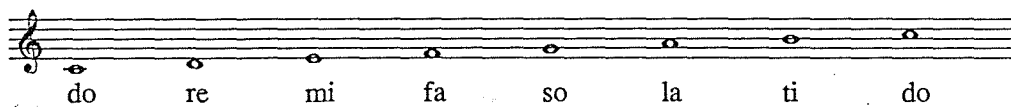
Or do we? The actual vote depends on the scales we choose to solfege.

On one hand, proponents of do-based minor might point out that the difference all but disappears if we choose to solfege major scales and melodic minor scales. Example 2 shows that la-based minor, in order to solfege the raised sixth and seventh scale degrees of the ascending melodic minor, must use two additional solfege syllables (*fi* and *si*), while do-based minor solfeges these notes with syllables already used in the major scale (*la* and *ti*); the vote is not seven vs. ten, but nine vs. ten.

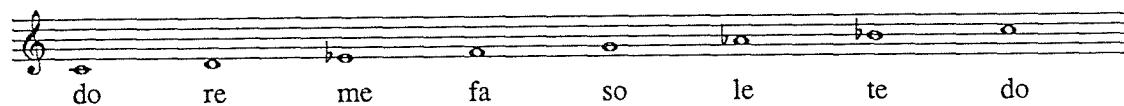
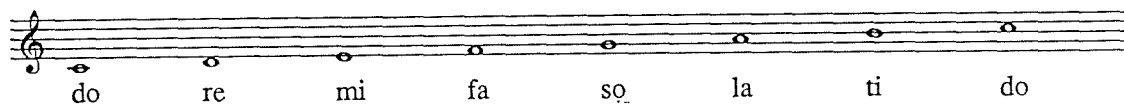
²Bernarr Rainbow, “Tonic Sol-fa,” *The New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie, vol. 19 (London: Macmillan, 1986), 61-65.

Example 1. Solfeging major scales and minor scales with la-based minor and do-based minor

la-based minor

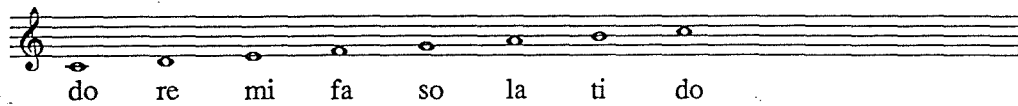


do-based minor

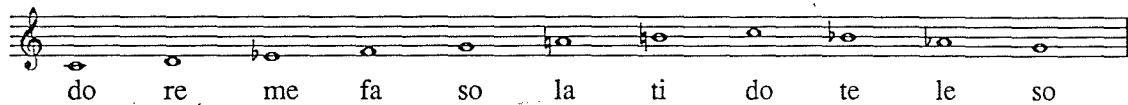


Example 2. Solfegeing major scales and melodic minor scales with la-based minor and do-based minor

la-based minor



do-based minor



On the other hand, proponents of la-based minor might counter that the difference in the number of syllables used becomes in fact even more pronounced if we choose to solfege the six diatonic modes. The following description of do-based minor, although it falsely attributes that system to Curwen (the tonic sol-fa of Sarah Glover and John Curwen was a la-based minor system, not a do-based minor system), does compare the systems in terms of the number of syllables one must learn.

In the movable “do” system, with a “do based minor,” the “tonic solfa” system used by Curwen, “do” is always associated with the resting tone regardless of tonality and keyality. Thus, chromatic syllables must be

employed to perform the diatonic scale in every tonality except major. For example, in harmonic minor tonality “me” is used in place of “mi” and “le” is used in place of “la”; in dorian tonality, “me” is used in place of “mi” and “te” is used in place of “ti”; and in lydian tonality, “fi” is used in place of “fa.” Not only does the development of audiation skill become complicated in that system, but also the five ascending chromatic syllables and the five descending chromatic syllables must be learned in addition to the seven diatonic syllables in order to sing diatonic tonal patterns in all tonalities. On the other hand, when the movable “do” system with a “la” based minor is used, the seven diatonic syllables, with the addition of only “si” for harmonic minor tonality, are all that need to be learned to serve the same needs.³

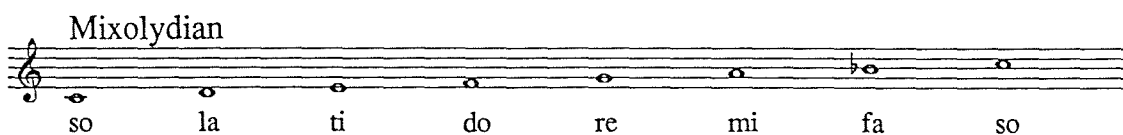
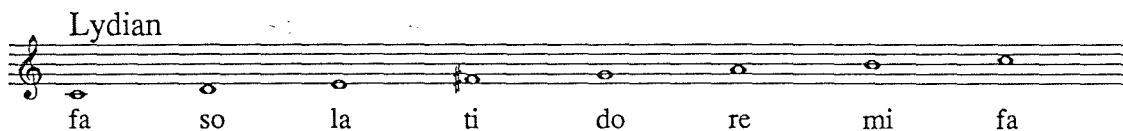
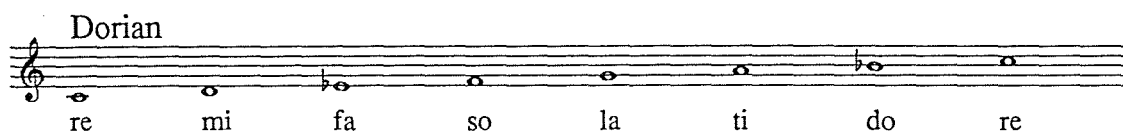
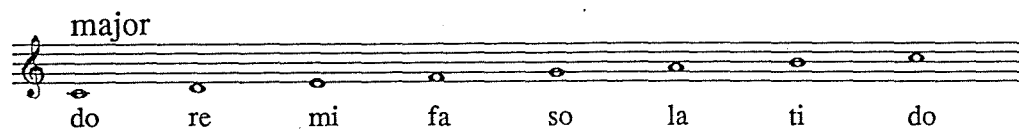
Gordon defines “keyality” as “the pitch name of the tonic.” He defines “tonality” as “synonymous with modality” – his “tonalities” include the diatonic modes and harmonic minor. Thus it would appear that, for singing these modes, Gordon puts the vote at eight syllables (seven diatonic syllables plus *si* for harmonic minor) for la-based minor vs. seventeen syllables (seven diatonic syllables plus five ascending and five descending chromatic syllables) for do-based minor.

Eight to seventeen may seem a dramatic difference, but this vote needs to be recounted. As Examples 3 and 4 show, do-based minor, in order to solfège these same modes, uses not seventeen but twelve syllables. This makes the vote a less dramatic eight vs. twelve in favor of la-based minor.

But what if we decide to choose the solfège system that uses the fewest number of syllables, not for singing scales, but for singing passages of music? Again, the actual “vote” depends on the passages we choose to solfège.

³Edwin Gordon, *Learning Sequences in Music: Skill, Content, and Patterns* (Chicago: G. I. A. Publications, Inc., 1988), 252-253.

Example 3. Solfeging Gordon's tonalities with la-based minor



Example 4. Solfeging Gordon's tonalities with do-based minor

major
do re mi fa so la ti do

Dorian
do re me fa so la te do

Phrygian
do ra me fa so le te do

Lydian
do re mi fi so la ti do

Mixolydian
do re mi fa so la te do

Aeolian
do re me fa so le te do

harmonic minor
do re me fa so le ti do

Example 5a. Johann Sebastian Bach, "Prelude" no. 1 in C major from *Well Tempered Clavier (Book I)*, concluding dominant and tonic pedals (mm. 24-35)

The musical score is presented in four systems, each with a treble and bass clef staff. Measure numbers 24, 27, 30, and 33 are indicated at the beginning of their respective systems. The bass line features a dominant pedal (F) from measure 24 to 32, and a tonic pedal (C) from measure 33 to 35. The treble line consists of a continuous eighth-note pattern. The piece concludes with a final cadence in measure 35.

SUMMARY

do-based minor: do, re, me, mi, fa, fi, so, la, te, ti (10 syllables)

la-based minor: do, re, me, mi, fa, fi, so, la, te, ti (10 syllables)

Example 5b. Johann Sebastian Bach, "Prelude" no. 2 in C minor from *Well Tempered Clavier (Book I)*, concluding dominant and tonic pedals (mm. 21-38)

21

22

25

destra

destra

sinistra

28

presto

Example 5b. (continued)

The musical score consists of three systems of piano accompaniment. The first system, starting at measure 31, features a complex rhythmic pattern with sixteenth-note runs in both the treble and bass staves. The second system, starting at measure 34, is marked *adagio* and features a dense texture of sixteenth-note chords in the treble, with a more sparse bass line. The tempo then changes to *allegro* for the final part of the system, where the treble staff has a more melodic line and the bass line has a steady eighth-note accompaniment. The third system, starting at measure 36, continues the *allegro* tempo with similar rhythmic patterns in both staves.

SUMMARY

do-based minor: do, ra, re, me, mi, fa, fi, so, le, la, te, ti (12 syllables)

la-based minor: la, te, ti, do, di, re, ri, mi, fa, fi, so, si (12 syllables)

Example 5c. Wolfgang Amadeus Mozart, *Symphony no. 40 in G minor*
(K. 550), first movement, entire first phrase (mm. 1-20)

Molto Allegro

Flauto

Oboi

Fagotti

Corno in Si^b3/B alto

Corno in Sol¹/G

Violino I

Violino II

Viola

Violoncello e Basso

6

6

Example 5c (continued).

The musical score consists of two systems of staves. The first system includes three staves: a treble clef staff with a key signature of one flat and a common time signature, and two bass clef staves. The second system includes five staves: two treble clef staves, a grand staff (treble and bass clefs), and a single bass clef staff. The score begins at measure 12, indicated by a '12' above the first staff. The music features melodic lines with slurs and dynamic markings such as 'p' (piano). The notation includes various rhythmic values and accidentals, including sharps and flats.

Example 5c. (continued)

The musical score consists of three systems of staves. The first system has three staves (treble, alto, and bass clefs) with a key signature of two flats and a common time signature. It features a melody in the treble clef and accompaniment in the alto and bass clefs. The second system has two staves (treble and bass clefs) with a key signature of two flats and a common time signature, featuring a melody in the treble clef and accompaniment in the bass clef. The third system has four staves (treble, alto, bass, and bass clefs) with a key signature of two flats and a common time signature, featuring a melody in the treble clef and accompaniment in the alto, bass, and bass clefs. The number 19 is written above the first measure of the first system. The dynamic marking 'f' is present in the first measure of each staff in all three systems.

SUMMARY

do-based minor: do, re, me, fa, fi, so, le, la, te, ti (10 syllables)

la-based minor: la, ti, do, re, ri, mi, fa, fi, so, si (10 syllables)

Example 5d. Ludwig van Beethoven, *Symphony no. 5 in C minor* (op. 67), first movement, entire first phrase (mm. 1-20)

Allegro con brio ($\text{♩} = 108$)

Flauto I II

Oboe I II

Clarinetto in B I II

Fagotto I II

Corno in Es I II

Tromba in C I II

Timpani in C, G

Violino I

Violino II

Viola

Violoncello

Basso

Allegro con brio ($\text{♩} = 108$)

Example 5d. (continued)

14

p cresc. f

p cresc. f

p cresc. f

cresc. f

p cresc. f

p cresc. f

p cresc. f

cresc. f

cresc. f

cresc. f

cresc. f

p cresc. f

SUMMARY

do-based minor: do, re, me, fa, fi, so, le, ti (8 syllables)

la-based minor: la, ti, do, re, ri, mi, fa, si (8 syllables)

Example 5e. Robert Schumann, “Ich grolle nicht,” mm. 1-4

Nicht zu schnell.

mf

Ich grolle nicht, und wenn das Herz auch bricht,

mf

SUMMARY

do-based minor: do, re, mi, fa, so, le, ti (7 syllables)

la-based minor: do, re, mi, fa, so, le, ti (7 syllables)

Example 5f. Charlie Parker, “Oh, Lady Be Good!” (1946), opening gesture of first improvised chorus (mm. 1-3)

SUMMARY

do-based minor: do, re, me, mi, fa, so, la (7 syllables)

la-based minor: do, re, me, mi, fa, so, la (7 syllables)

Consider the passages listed in Example 5. This listing includes passages in major and passages in minor. Since none of these passages really modulate, we avoid any of the argument that might arise in “mutation”—that is, the change of the one-to-one correspondence between notated pitch and sung syllable. (Of course, even in these clear and familiar passages, some students may want to “mutate”—the way we must in a real modulation if we are using a movable-do system. This tendency to mistake chromaticism for modulation and to lose the tonal center in such simple, clearly non-modulating phrases represents another problem, whose source lies in students’ lack of experience and unfamiliarity with the repertoire. While this problem lies beyond my immediate point here, it seems to me that the structure of pedagogical solutions to this problem may be central to choosing a solfège system.) Figure 1 shows that if we solfège these passages using la-based minor, we use fifteen solfège syllables; if we solfège these phrases using do-based minor, we use only twelve syllables.

If we decide to choose the solfège system that uses the fewest number of syllables for singing these passages of music, then we choose do-based minor over la-based minor by a vote of twelve vs. fifteen.

Of course, if we choose a different group of passages, we may get a different vote. (However, it should be noted that, because of the prevalence of modal mixture, any representative selection that includes pieces from the common-practice period will usually require at least as many syllables—if not more—in la-based minor as compared with do-based minor.) In the phrases chosen above, the same twelve scale degrees appear in major as appear in minor. Do-based minor uses the same names for these scale degrees whether they occur in major or minor, but since la-based minor names these scale degrees differently in major and in minor, it must introduce additional names for these common scale degrees.

Figure 1. Scale degrees used in selected passages

(“#” means “raised with respect to major” and “b” means “lowered with respect to major,” regardless of key signature)

for the pieces in major

scale degrees	(do-based)	(la-based)
7	ti	ti
b7	te	te
6	la	la
b6	le	le
5	so	so
#4	fi	fi
4	fa	fa
3	mi	mi
b3	me	me
2	re	re
b2	ra	ra
1	do	do

for the pieces in minor

scale degrees	(do-based)	(la-based)
7	ti	si
b7	te	so
6	la	fi
b6	le	fa
5	so	mi
#4	fi	ri
4	fa	re
3	mi	di
b3	me	do
2	re	ti
b2	ra	te
1	do	la

SUMMARY: If we solfege the selected passages using la-based minor, we use fifteen solfege syllables (“do, di, ra, re, ri, me, mi, fa, fi, so, si, le, la, te, ti”). If we solfege these phrases using do-based minor, we use only twelve syllables (“do, ra, re, me, mi, fa, fi, so, le, la, te, ti”).

But what does it mean to count solfege syllables in this way? What do we really mean when we assert that students must learn fewer syllables if they wish to solfege certain scales with la-based minor or that they must learn fewer syllables if they wish to solfege certain passages of music with do-based minor? In what sense is it better to learn fewer syllables?

If we want to count the number of syllables a given solfege system requires one to learn, then we must understand what it means to “learn a syllable.” The analogy to language is instructive here; we can compare a solfege syllable to a word. We learn a word not merely by learning its definition(s), but also by learning how to use it. We learn a solfege syllable the same way—not merely by learning its definition(s) (that is, what sound(s) or notational symbol(s) that syllable

refers to), but also by using it in specific musical activities.

If to “learn syllables” one means to acquire the ability to use them in specific tasks, let’s consider the use of solfege syllables in two basic tasks: sight singing (converting notation into sound) and transcription (converting sound into notation, also called dictation). Figure 2 offers simplified models of these tasks; while the performance of these tasks is certainly more complex than the models suggest, and the use of solfege syllables also more complex, these models will help clarify questions about the number of solfege syllables one must learn and the relevance of this number in evaluating systems of solfege.

The notation-to-sound model suggests that in a task (such as sight singing) that requires the conversion of notation into sound, we can think of the conversion going through two steps. In the first step, notation is converted into solfege syllables; this conversion is accomplished through the aid of one set of rules. In the second step, syllables are converted into sound; this conversion is accomplished through the aid of a second set of rules.

The sound-to-notation model suggests that in a task (such as transcription) that requires the conversion of sound into notation, we can think of the conversion going through two new steps—steps that differ from those already described. A third set of rules aids the conversion of sound into syllables. And a fourth set of rules aids the conversion of syllables into notation.

It is only in examining these four sets of rules that we can properly answer questions about the relevance of the number of solfege syllables one must learn for the tasks described. Figures 3 through 20 present models of these conversions.

These rule systems are not meant to model details of the cognitive process of conversion. Rather, they are intended to give an account of the relative complexity of what it means to “learn syllables” where “learning syllables” is understood as using the relationships they explicitly model.

Figure 2. Models of notation-to-sound conversion and sound-to-notation conversion

Notation-to-Sound (e.g., sightsinging)

Notation



Notation-to-Syllable Conversion (a set of rules for converting notation into syllables)

Syllables



Syllable-to-Sound Conversion (a set of rules for converting syllables into sound)

Sound

Sound-to-Notation (e.g., transcription)

Sound



Sound-to-Syllable Conversion (a set of rules for converting notation into syllables)

Syllables



Syllable-to-Notation Conversion (a set of rules for converting syllables into sound)

Notation

Figure 3. Rules for converting notation into “instantly-movable na” solfège syllables

1.1) Convert all notes into the syllable “na.”

Number of rules: 1

Relative precision of rules: precise

Relative ease of application of rules: very easy

Figure 4. Rules for converting “instantly-movable na” solfège syllables into sound

Number of rules: 0

Figure 5. The conversion of sound into “instantly-movable na” solfège syllables

3.1) Convert all notes into the syllable “na.”

Number of rules: 1

Relative precision of rules: precise

Relative ease of application of rules: very easy

Figure 6. The conversion of “instantly-movable na” solfège syllables into notation

Number of rules: 0

Figure 7. Rules for converting notation into fixed-do solfege syllables

1.1) If the notated pitch would bear the letter name C	regardless of accidentals (such as C, C#, Cb, C##, Cbb, etc.; for example, the third space of a five-line staff if it bears a treble clef or the middle line of a five-line staff that bears an alto clef),	then convert that pitch into the syllable "do."
1.2-7) If the notated pitch would bear the letter name	regardless of accidentals,	then convert that pitch into the syllable
	D	"re."
	E	"mi."
	F	"fa."
	G	"so."
	A	"la."
	B	"ti."

Number of rules: 7

Relative precision of rules: precise

Relative ease of application of rules: easy

Figure 8. Rules for converting fixed-do solfège syllables into sound

- 2.0) Determine (or assign) a note to the first syllable.
- 2.1) If one syllable moves to another of the same name (without a change of octave), then sing the interval of a prime.
- 2.2a) If
- “do” ascends to the nearest “re,”
 - “re” ascends to the nearest “mi,”
 - “mi” ascends to the nearest “fa,”
 - “fa” ascends to the nearest “so,”
 - “so” ascends to the nearest “la,”
 - “la” ascends to the nearest “ti,”
- or
- “ti” ascends to the nearest “do,”
- then sing the interval of an ascending second.
- 2.2d) If
- “do” descends to the nearest “ti,”
 - “re” descends to the nearest “do,”
 - “mi” descends to the nearest “re,”
 - “fa” descends to the nearest “mi,”
 - “so” descends to the nearest “fa,”
 - “la” descends to the nearest “so,”
- or
- “ti” descends to the nearest “la,”
- then sing the interval of a descending second.
- 2.3a) If
- “do” ascends to the nearest “mi,”
 - “re” ascends to the nearest “fa,”
 - “mi” ascends to the nearest “so,”
 - “fa” ascends to the nearest “la,”
 - “so” ascends to the nearest “ti,”
 - “la” ascends to the nearest “do,”
- or
- “ti” ascends to the nearest “re,”
- then sing the interval of an ascending third.
- etc.

Number of rules: for intervals an octave or smaller, 100

Relative precision of rules: imprecise

Relative ease of application of rules: very hard

Figure 9. The conversion of sound into fixed-do solfege syllables

3.0) Determine (or assign) the solfege syllable of the first note.

3.1) For the interval of a prime, keep the same syllable.

3.2a) For the interval of an ascending second,

“do” is followed by “re,”

“re” is followed by “mi,”

“mi” is followed by “fa,”

“fa” is followed by “so,”

“so” is followed by “la,”

“la” is followed by “ti,”

or

“ti” is followed by “do.”

3.2d) For the interval of a descending second,

“do” is followed by “ti,”

“re” is followed by “do,”

“mi” is followed by “re,”

“fa” is followed by “mi,”

“so” is followed by “fa,”

“la” is followed by “so,”

or

“ti” is followed by “la.”

3.3a) For the interval of an ascending third,

“do” is followed by “mi,”

“re” is followed by “fa,”

“mi” is followed by “so,”

“fa” is followed by “la,”

“so” is followed by “ti,”

“la” is followed by “do,”

or

“ti” is followed by “re.”

Figure 9. (continued)

3.3d) For the interval of a descending third,

“do” is followed by “la,”

“re” is followed by “ti,”

“mi” is followed by “do,”

“fa” is followed by “re,”

“so” is followed by “mi,”

“la” is followed by “fa,”

or

“ti” is followed by “so.”

etc.

Number of rules: for intervals an octave or smaller, 100

Relative precision of rules: precise

Relative ease of application of rules: hardest

Figure 10. The conversion of fixed-do solfège syllables into notation

4.1) Convert the syllable into a notated pitch that would bear the letter name

“do”

C

(for example, a note on the third space of a five-line staff if it bears a treble clef or the middle line of a five-line staff that bears an alto clef).

4.2-7) Convert the syllable into a notated pitch that would bear the letter name

“re”

D

“mi”

E

“fa”

F

“so”

G

“la”

A

“ti”

B

Number of rules: 7

Relative precision of rules: imprecise (the rules do not indicate the correct accidental)

Relative ease of application of rules: easy

Figure 11. The conversion of notation into do-based minor solfege syllables

1.0) Determine the key.

1.1-17) Convert the note that functions as scale degree into the syllable

7	“ti.”
b7	“te.”
#6	“li.”
6	“la.”
b6	“le.”
#5	“si.”
5	“so.”
b5	“se.”
#4	“fi.”
4	“fa.”
3	“mi.”
b3	“me.”
#2	“ri.”
2	“re.”
b2	“ra.”
#1	“di.”
1	“do.”

Number of rules: 18

Relative precision of rules: precision depends on clarity of tonal function

Relative ease of application of rules: hard

Figure 12. The conversion of do-based minor solfège syllables into sound

2.0) Determine (or assign) the pitch to the note that function as scale degree 1.

2.1-17) Convert the syllable into the note that functions as scale degree

“ti”	7.
“te”	b7.
“li”	#6.
“la”	6.
“le”	b6.
“si”	#5.
“so”	5.
“se”	b5.
“fi”	#4.
“fa”	4.
“mi”	3.
“me”	b3.
“ri”	#2.
“re”	2.
“ra”	b2.
“di”	#1.
“do”	1.

Number of rules: 18

Relative precision of rules: precise

Relative ease of application of rules: hard

Figure 13. The conversion of sound into do-based minor solfege syllables

3.1-17) Convert the note that functions as scale degree	into the syllable
7	“ti.”
b7	“te.”
#6	“li.”
6	“la.”
b6	“le.”
#5	“si.”
5	“so.”
b5	“se.”
#4	“fi.”
4	“fa.”
3	“mi.”
b3	“me.”
#2	“ri.”
2	“re.”
b2	“ra.”
#1	“di.”
1	“do.”

Number of rules: 17

Relative precision of rules: precision depends on clarity of tonal function

Relative ease of application of rules: hard

Figure 14. The conversion of do-based minor solfège syllables into notation

4.0) Determine the key.

4.1) Convert the syllable into the note that functions as scale degree

“ti”	7.
“te”	b7.
“li”	#6.
“la”	6.
“le”	b6.
“si”	#5.
“so”	5.
“se”	b5.
“fi”	#4.
“fa”	4.
“mi”	3.
“me”	b3.
“ri”	#2.
“re”	2.
“ra”	b2.
“di”	#1.
“do”	1.

Number of rules: 18

Relative precision of rules: precise

Relative ease of application of rules: hard

Figure 15. A first model of the conversion of notation into la-based minor solfege syllables

1.0) Determine the “appropriate do-signature.”

1.1) Convert any note (or line or space) that corresponds to the second-to-last flat or to the step above the last sharp of an “appropriate do-signature” (e.g., B \flat is the second-to-last flat in a signature of two flats, D is the step above the last sharp in a signature of two sharps, F plays the role in a signature of one flat, and C plays this role in a signature of no flats or sharps) into the syllable “do.”

1.1’, [an alternative wording of 1.1)] Convert to “do”:

any diatonic note that would bear the letter name:	regardless of accidentals, if an “appropriate do-signature” has:
A	four flats or three sharps.
B	two flats or five sharps.
C	no flats or sharps, or seven flats or sharps.
D	five flats or two sharps.
E	three flats or four sharps.
F	one flat or six sharps.
G	six flats or one sharp.

1.2) Convert any note that lies one step above the second-to-last flat or two steps above the last sharp of an “appropriate do-signature” into the syllable “re.”

etc.

Number of rules: 19

Relative precision of rules: precision depends on clarity of diatonic collection
position

Relative ease of application of rules: hard

Figure 16. A first model of the conversion of la-based minor solfège syllables into sound

- 2.0a) Determine the mode.
 2.0b) Determine (or assign) the tonic.
 2.1) If the mode is Ionian or major,
 then convert the syllable into the note that functions as scale degree
- | | |
|------|-----|
| “ti” | 7. |
| “te” | b7. |
| “li” | #6. |
| “la” | 6. |
| “le” | b6. |
| “si” | #5. |
| “so” | 5. |
| “se” | b5. |
| “fi” | #4. |
| “fa” | 4. |
| “mi” | 3. |
| “me” | b3. |
| “ri” | #2. |
| “re” | 2. |
| “ra” | b2. |
| “di” | #1. |
| “do” | 1. |

Figure 16. (continued)

2.2) If the mode is Aeolian or minor,
 the convert the syllable into the note that functions as scale degree

“si”	7.
“so”	b7.
“fi”	6.
“fa”	b6.
“mi”	5.
“me”	b5.
“ri”	#4.
“re”	4.
“di”	3.
“do”	b3.
“ti”	2.
“te”	b2.
“li”	#1.
“la”	1.

etc.

Number of rules: $2+17+14+(7 \times 4) = 61$ up to $2+(6 \times 17) = 104$

Relative precision of rules: precise

Relative ease of application of rules: hard

Figure 17. A first model of the conversion of sound into la-based minor solfège syllables

- 3.0a) Determine the mode.
 3.0b) Determine (or assign) the pitch of scale degree 1 for that mode.
 3.1) If the mode is Ionian or major,
 then convert the note that into the syllable
 functions as scale degree

7	“ti.”
b7	“te.”
#6	“li.”
6	“la.”
b6	“le.”
#5	“si.”
5	“so.”
b5	“se.”
#4	“fi.”
4	“fa.”
3	“mi.”
b3	“me.”
#2	“ri.”
2	“re.”
b2	“ra.”
#1	“di.”
1	“do.”

Figure 17. (continued)

3.2)	If the mode is Aeolian or minor, then convert the note that functions as scale degree	into the syllable
	7	“si.”
	b7	“se.”
	6	“fi.”
	b6	“fa.”
	5	“mi.”
	b5	“me.”
	#4	“ri.”
	4	“re.”
	3	“di.”
	b3	“do.”
	2	“ti.”
	b2	“te.”
	#1	“li.”
	1	“la.”

etc.

Number of rules: $2+17+14+(7 \times 4) = 61$ up to $2+(6 \times 17) = 104$

Relative precision of rules: precision depends on clarity of tonal function

Relative ease of application of rules: harder

Figure 18. A first model of the conversion of la-based minor solfège syllables into notation

4.0) Determine or assign an “appropriate do-signature.”

4.1) Convert the syllable “do” into a note (or line or space) that corresponds to the second-to-last flat or to the step above the last sharp of an “appropriate do-signature” (e.g., B \flat is the second-to-last flat in a signature of two flats, D is the step above the last sharp in a signature of two sharps, F plays that role in a signature of one flat, and C plays this role in a signature of no flats or sharps).

4.1’, [an alternate wording of 4.1]) Convert the syllable “do” into:

the diatonic note that would	regardless of accidentals, if an
bear the letter name:	“appropriate do-signature” has:
A	four flats or three sharps.
B	two flats or five sharps.
C	no flats or sharps, or seven flats or sharps.
D	five flats or two sharps.
E	three flats or four sharps.
F	one flat or six sharps.
G	six flats or one sharp.

etc.

Number of rules: 18

Relative precision of rules: precise

Relative ease of application of rules: hard

Figure 19. A second model of the conversion of la-based minor solfege syllables into sound

2.0) Determine (or assign) a note to the first syllable.

2.1) If one syllable moves to another of the same name (and there is no change octave), then sing the interval of a prime.

2.2a) If

“mi” ascends to the nearest “fa,”

or

“ti” ascends to the nearest “do,”

then sing the interval of an ascending minor second.

2.2b) If

“do” ascends to the nearest “re,”

“re” ascends to the nearest “mi,”

“fa” ascends to the nearest “so,”

“so” ascends to the nearest “la,”

or

“la” ascends to the nearest “ti,”

then sing the interval of an ascending major second.

2.2c) If

“do” descends to the nearest “ti,”

or

“fa” descends to the nearest “mi,”

then sing the interval of a descending minor second.

2.2d) If

“re” descends to the nearest “do,”

“mi” descends to the nearest “re,”

“so” descends to the nearest “fa,”

“la” descends to the nearest “so,”

or

“ti” descends to the nearest “la,”

then sing the interval of a descending major second.

2.3a) If

“re” ascends to the nearest “fa,”

“mi” ascends to the nearest “so,”

“la” ascends to the nearest “do,”

or

“ti” ascends to the nearest “re,”

then sing the interval of an ascending minor third.

etc.

Figure 19. (continued)

Number of rules: for strictly diatonic passages and intervals an octave or smaller,
100
Relative precision of rules: precise
Relative ease of application of rules: hard

Figure 20. A second model of the conversion of sound into la-based
minor solfège syllables

(This model presumes that the same sound is always associated with the same
syllable.)

3.0) Convert into the syllable “do” that note whose diatonic collection includes
pitch classes:

- a) down a minor second
- b) up a major second
- c) up a major third
- d) up a perfect fourth
- e) up a perfect fifth
- and
- f) up a major sixth

etc.

Number of rules: for strictly diatonic music, 7
Relative precision of rules: precision depends on clarity of diatonic collection
position
Relative ease of application of rules: harder

Figure 21. A summary of conversion models

NOTATION-TO-SOUND

	<i>inst.- mov. na</i>	<i>fixed- do</i>	<i>do-based minor</i>	<i>la-based minor (I)</i>	<i>la-based minor (II)</i>
<i>Notation-to-syllables</i>					
number of rules	1	7	18	18	18
rel. precision	precise	precise	dep. on clar. of function	dep. on clar. of function	dep. on clar. of coll. pos.
rel. ease	very easy	easy	hard	hard	hard
<i>Syllables-to-sound</i>					
number of rules	0	100	18	61-104	100-?
rel. precision		imprecise	precise	precise	precise
rel. ease		very hard	hard	hard	hard
<i>Total notation-to- sound rules</i>	1	107	36	80-122	119-?

Figure 21. (continued)

SOUND-TO-NOTATION

	<i>inst.- mov. na</i>	<i>fixed- do</i>	<i>do-based minor</i>	<i>la-based minor (I)</i>	<i>la-based minor (II)</i>
<i>Sound-to-syllables</i>					
number of rules	1	100	17	61-104	7-?
rel. precision	precise	precise	dep. on clar. of function	dep. on clar. of function	dep. on clar. of coll. pos.
rel. ease	easy	hardest	hard	harder	harder
<i>Syllables-to-notation</i>					
number of rules	0	7	18	18	18
rel. precision		imprecise	precise	precise	precise
rel. ease		easy	hard	hard	hard
<i>Total sound-to- notation rules</i>	1	107	35	79-121	25-?

Each of the Figures 3 through 20 is followed by a summary. And those summaries are compiled in Figure 21. As the summaries suggest—if we accept the idea that these rules model some aspect of relevant behavior—the important question is not “how many syllables?”. The important questions are “how many rules?”, “how precisely do the rules determine a result?”, and “how easy is it to apply the rules?”.

While comparing solfège systems this way, we will inevitably see

some “tradeoffs”: easy rules to learn may be hard to apply; a system that uses a lot of rules for one part of the process may use few for another part of the process; precision that is an advantage in one context may be a handicap in another.

Some people who have noticed these tradeoffs have advanced an interesting argument. According to this argument, we cannot choose a best system. All solfege systems model a finite number of musical relationships in different ways. And the number of importance is the number of musical relationships, not any number inherently related to a system. Solfege is a tool—a means, not an end. According to this argument, then, it is the music that matters, and not the tool.

This argument has some merit. It is not possible to choose a “best solfege system”—without knowing which students will use it, for which specific objectives, and with which specific repertoires. However, I am wary of any argument whose effective message is “don’t think about this problem too much.” There are real differences between solfege systems. And if we can recognize that some systems are better suited for some purposes, we can choose the best system for a given purpose. In order to do this, more clear thinking—not less—is required.

According to Figures 11 and 15, la-based minor and do-based minor use the same number of rules to convert notation into syllables. But if we compare la-based minor to do-based minor, which rules are easier to apply? Which rules are more precise? This may depend on the passage being solfeged. If we can assume the passage has an “appropriate do-signature,” then the rules will be easier to apply for la-based minor than for do-based minor. (This is because an “appropriate do-signature” is sufficient to determine correct syllables for la-based minor, but insufficient for do-based minor, in which the location of the scale degrees must be determined.) But if we cannot assume that the passage has an “appropriate do-signature,” (which probably includes most of the music that our students will deal with as professional musicians), then the rules will be slightly easier to apply for do-based minor than for la-based minor (this is because for do-based minor, one need only determine the location of the tonic scale

degree in order to apply the rules, while for la-based minor, one must determine both the location of the tonic and the mode).

But in conversion of syllables into sound, Figure 12 shows that the number of rules for do-based minor is 18, while according to Figure 16, the number of rules for la-based minor must be put well above 60. Each syllable in la-based minor is converted into a different sound, depending on the mode, requiring another rule.

Since the rules for converting la-based minor syllables into sound give information both about scale degree and about mode, they may seem to determine more precisely a given sound than do the rules for do-based minor. Unexamined, this assertion seems reasonable. It rests on the assumptions, for example, that the sound “sixth scale degree in Lydian” (*la* in do-based minor and *re* in la-based minor) differs from the sound “sixth scale degree in Mixolydian” (again *la* in do-based minor but now *mi* in la-based minor) and that both are more precise than the simpler sound “sixth scale degree” (always *la* in do-based minor but undetermined in la-based minor). However, it would be wrong to assert that the use of la-based minor guarantees this greater precision. In fact, the models given in Figures 3 through 20 suggest the opposite. The only way to guarantee that a solfège system would have this precision would be for it to have a one-to-one correspondence between rule and syllable—it would have to use a totally different set of syllables for every mode. It may seem that la-based minor distinguishes between the sixth scale degree in Lydian and the sixth scale degree in Mixolydian by using a different solfège syllable. But the solfège syllable alone does not make this distinction. If we were to claim that it did, we would also have to recognize that la-based minor does not distinguish between the second scale degree in minor, the third scale degree in Mixolydian, the fourth scale degree in Lydian, the fifth scale degree in Phrygian, the sixth scale degree in Dorian, and the leading tone in major—la-based minor calls all these different aural concepts *ti* (and these sounds differ more from one another more than the sixth scale degree of Mixolydian differs from the sixth scale degree of Lydian). So much for precision! If the use of la-based minor develops a more precise grasp of scale degree within a mode, it does so by having the student keep constantly in mind both scale degree and

mode (something that is easy for the student to avoid if a key signature is conceived of as a “do-signature”). The same thing can be accomplished in do-based minor.

One way to clarify the point about the number of rules (as opposed to the number of syllables) one must learn is to consider an analogy. Let’s imagine that you wanted to learn one of two foreign languages. We’ll call them “D-speak” and “L-speak.” If I told you that the L-speak dictionary had seven words, while the D-speak dictionary had seventeen, you might think that it would be easier to learn L-speak. But if I then told you that each word in the L-speak dictionary had seven definitions (for a total of 49 entries), while each word in the D-speak dictionary had only one definition (for a total of 17 entries), then you might think that it would be easier to learn D-speak. Furthermore, if I then told you that the meaning of L-speak words changed every day so that the seventh word in the dictionary meant the same thing on the first day that the sixth word meant on the second day, you might think it a needlessly complex language. Like L-speak, la-based minor uses a vocabulary of syllables that at first may seem smaller, but it is a much more complex system, because each syllable has a different meaning in different situations. But unlike L-speak, la-based minor, if it is to deal with the full range of music taught in contemporary music schools, must use as many syllables as do-based minor—each with six different psychologically contradictory definitions.

Again, however, we may question how well the rules listed model the musical behavior. The rules assert that a student has to learn one syllable several times (the student must learn that in different contexts, *ti* may mean the second scale degree in minor, the third scale degree in Mixolydian, the fourth scale degree in Lydian, the fifth scale degree in Phrygian, the sixth scale degree in Dorian, or the leading tone in major). Since these definitions contradict one another, it may be that instead, the student will learn a set of rules that are more consistent. Figure 19 lists such a set of rules. The number of rules listed is 100. And this is for music that is strictly diatonic! Furthermore, this set of rules, because it measures intervals between adjacent notes rather than

locating the notes with respect to the tonic, suggests unsuccessful sight singing.⁴

The only way a proponent of la-based minor can claim that the system uses fewer syllables is to assert that that system gives the same syllable to the same sound. And proponents of la-based minor have asserted just that. Figure 20 presents a set of rules based on this assertion. There are repertoires in which the rules of Figure 20 seem to apply. In such repertoires, there is not a strong sense of scale-degree function (that is, it makes little sense to ask “where’s the tonic?” and thus it also makes little sense to ask “what’s the mode?”)—one only has a sense of where one is within the diatonic collection (that is, one has a sense of “diatonic-collection position”). Common-practice tonal music, with its strong sense of scale-degree function, is not such a repertoire.

Conclusions

It is impossible to say—in the abstract—that any one solfège system is superior to another. Specific solfège systems should be chosen for specific students, for specific educational objectives, and for specific repertoires. And every solfège system has the honor of being the best system for at least one given purpose.

But to say that we have a responsibility to be clear about our objectives and that we have a responsibility to choose the solfège systems that best serve those objectives is a far cry from saying that all systems are equal and that it does not matter which we use. In fact, this paper points up some of the striking problems created by la-based minor. There are some applications that make it the system of choice. But if our purpose is to vivify scale degree function, do-based minor appears to be a better choice.

⁴On the perils of reading by interval in the fashion depicted in Figure 19, see Michael R. Rogers, “Beyond Intervals: The Teaching of Tonal Hearing,” *Indiana Theory Review* 6/3 (1983): 18-34 and William Thomson, “What is an Interval?,” *Journal of Music Theory Pedagogy* 2/2 (1988): 321-325.

My primary purpose has been to show how debates about even an apparently simple question, such as “Which solfege system requires the student to learn more syllables?”, can show us the value of models for understanding how we think about music, how we think in music, and how we make decisions to help others think in and about music.