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Musical texts and information retrieval: the case of the early modern *battaglia*

Almost all musicological research relies in some way upon the use of catalogues and other finding aids, enabling users to discover, organize and filter their raw materials—usually the notated music itself. As online resources get larger and more numerous and the volume of musical material instantly available becomes greater, the need for satisfactory retrieval systems becomes more pressing. Furthermore, this growth is accompanied by a corresponding increase in the potential for novel discoveries, resulting from sophisticated retrieval across a dataset too large to be considered easily and methodically by musicologists. In this article, we briefly outline some of the shortcomings of traditional musicological finding aids and consider the risks of carrying those limitations over into the digital world when designing new tools for the storage and retrieval of musical data.

In order to explore these issues, we shall draw upon the instrumental *battaglia* (or battle piece), a descriptive genre which enjoyed widespread popularity across early modern Europe. These pieces are often lengthy collages of mimetic material, designed to evoke the sounds of trumpets, drums and fifes, the sonic dimensions of early modern warfare. Musically, these elements are rather simplistic, reflecting the inherent limitations of the instruments and ensembles being depicted: repeated rhythmic patterns, fanfare-like figures and snatches of diatonic melody, usually presented over a backdrop of static tonic harmony.[1]

Today such works are rarely heard on the concert stage or in the recording studio,[2] and their reception amongst musicologists has also been largely negative. Of two important recent overviews of early modern instrumental practices, one made no mention of the *battaglia* tradition at all,[3] whereas the other merely noted that such pieces were once popular but now 'tend to be denigrated by modern commentators'.[4] The latter point is certainly true. In his monograph on Frescobaldi, Frederick Hammond devoted just a single sentence to the *Capriccio sopra la Battaglia*: 'The *Battaglia* (qualified as "navale" in one copy) is without doubt the weakest piece of music Girolamo ever published'.[5] And Diana Poulton, when discussing an anonymous English programmatic work preserved in several Elizabethan and Jacobean lute sources, remarked that 'this long and incredibly boring piece has 318 bars, most of which consist of repetitious pattern making on the chord of F major'.[6]

Yet this niche repertory is both an important and instructive one. The sheer number of battle pieces in extant 16th- and 17th-century sources points to their popularity amongst contemporaneous musicians, and they also provide us with a rich seam of insights into both the processes of musical transmission and conceptions of musical relatedness. Although these pieces are sometimes assumed to be derived directly from Clément Janequin's famous chanson *La bataille de Marignan* (1528), this group actually constitutes a much more loosely defined genre, connected by various melodic, motivic, harmonic, textural and paratextual features; they are not merely the progeny of a single seminal work.

Whilst exploring this genre, we must keep in mind that we are trying to process the notated remnants of a musical tradition very much rooted in performance—a quasi-improvisatory area of practice in which aurally and textually transmitted materials could freely intermingle. On 23 September 1624, the

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Dutch schoolteacher David Beck visited the Grote Kerk in The Hague, writing in his diary that he had 'heard for the duration of one hour the battle of Pavia played on the organ, attended by many people' (*hoorende oock onderwijlen in de groote kerck wel een uijre lanck de slag van Pauijen op den Orgel spelen, alwaer veel volck was*).[7] It is not difficult to imagine how a lengthy performance might have been generated using stock materials—perhaps some explicit quotations from earlier pieces, fragments and motivic ideas from a few others, and a measure of improvisation in the same vein as an adhesive for these components. In such cases, these musical gestures are all drawn from a well-known stylistic vocabulary, having gained an identity of their own, divorced from their original contexts and creators.

Battle pieces thus exhibit what Robert Hatten has usefully termed *strategic intertextuality*—i.e. making references to specific works (including each other and those from related genres and beyond)—as well as broader *stylistic intertextuality*, i.e. belonging more generally to a recognizable style-based genre, forged through a combination of musical ingredients.[8] But how should retrieval systems convey these relationships between pieces and make them navigable to users? As we shall see, the early modern *battaglia* not only poses a challenge to existing musicological resources, but serves as a useful touchstone as we seek to design digital resources which can reflect more flexible conceptions of musical relatedness and similarity.

Musicological resources

The inherent limitations of traditional musicological tools will undoubtedly be well known to many readers but, for clarity, we briefly outline some of these here:

- **Author–title catalogues** (such as those published in Christian Meyer's series *Sources manuscrites en tablature*) are primarily concerned with a limited set of metadata.[9] Clearly, anonymous and untitled pieces are almost impossible to identify in such resources, whilst the presence of generic titles (for example, 'battle', 'fantasia', 'gavotte' etc.) or commonly set song-texts can suggest connections that turn out to be superficial or even non-existent.
- **Incipit catalogues** (such as *RISM*) supplement metadata with the opening musical content judged to be most representative of each piece, usually a brief monophonic extract.[10] Such catalogues generally list only one incipit per work or movement, although some provide several.[11] However, the use of incipit lists is underpinned by a number of problematic assumptions, not least the expectation of musical homogeneity between pieces which share the same opening motif, and that the constituent components of a specific work will always appear together. Incipit catalogues also reinforce the assumption that using monophonic melodic motifs is sufficient whereas, in some contexts, polyphonic ideas or other harmonic or textural signifiers are recognized as markers of musical relatedness.
- **Concordance lists** represent an expert judgement regarding musical relationships. Although clarity about the nature of the relationships being recorded may vary from one compiler to another (especially regarding looser relationships, arrangements and partial concordances), these resources are of enormous value. They are, however, tremendously labour-intensive to produce, requiring considerable specialist knowledge and, as newly emerging primary sources are explored and catalogued, they require frequent updating in order to maintain their usefulness.

However, musicologists have long been troubled by the problem of defining 'concordances'. In the preface to his monumental catalogue of 16th-century printed instrumental music, Howard Mayer Brown noted the need to indicate exact concordances (that is, identical reprints of pieces) as well as closely related items and the vocal models for instrumental arrangements (which often represent a conceptual link rather than direct modelling on the earlier work).[12] He also acknowledged the difficulties posed by 'different arrangements of the same thematic material' and conceded that he had only listed concordances between dance pieces where they were 'identical settings of the same melodies'; other kinds of relatedness (such as re-harmonizations of similar melodies, or works sharing only harmonic/chord progressions) were left unrecorded.[13] Finally, Brown lamented the problems he had faced whilst trying to compile these

cross-references from his incipit lists, for 'occasionally a piece will begin in the same way as another and continue differently'.[14] Of course, these observations do not detract from the seminal status of Brown's catalogue as a research tool—but they do underline both the problems posed by this broad spectrum of musical relatedness and the challenges of representing such information usefully in printed form.

We believe there is a strong need for digital resources that combine both musical content and catalogue-style metadata, enabling these to be interrogated together in a meaningful way. There are dangers, however. Just as recent scholarship has challenged the idea of the 'musical work' as a fixed, discrete entity—especially for pre-1800 repertories—we need to develop resources which reflect the complex ontological status of early modern music in more nuanced ways. If we build systems based upon assumptions about music that we know to be flawed, then the results retrieved are very likely to reinforce those problematic assumptions.

Case study: a 'cluster' of related battle pieces

A detailed exploration of the *battaglia* as a genre would reveal an overwhelmingly diverse variety of connections between pieces, stretching well beyond the scope of this article.[15] For illustrative purposes, we have instead selected a group of four closely related battle pieces, all published during the first decades of the 17th century (see Table 1). Although it has long been recognized that they share some common ingredients, there is no direct stemmatic relationship between these four pieces.[16] Together, they reveal not only numerous melodic, motivic and harmonic connections, but also a huge degree of formal divergence between them. It is this paradox—a group of demonstrably related pieces which nevertheless display very little exact duplication of material from one another—which poses such a challenge to the traditional musicological finding aids discussed earlier.

The overall schematic form of these four pieces is loosely represented in Table 2. However, this should be regarded as a conceptual map giving the relative location of selected features rather than an exhaustive summary of their musical contents (all four pieces contain other material). Nor should it be inferred that vertically aligned segments are of equal duration. The interrelationships between these pieces are complex and very rich in detail, and we refer the interested reader to the original texts for more detailed comparison.

The openings of Besard and Fuhrmann are very closely related (ex.1a), with most of their differences being purely syntactical—Besard presents this material in triple metre whilst Fuhrmann opts for quadruple and detaches the opening dozen or so bars to form a discrete prelude. Otherwise, these texts sometimes

Table 1 Four early 17th-century battle pieces

Abbreviation	*Title/ascription*	*Source*	*Medium/notation*
Negri	'La battaglia'	Cesare Negri, *Le gratie d'amore* (Milan, 1602), pp.260–3	Melody part (mensural notation); six-course lute (Italian lute tablature). NB: divergent settings, so alternatives rather than for simultaneous performance.
Besard	'Battaille de Pauie'	Jean-Baptiste Besard, *Thesaurus Harmonicus* (Cologne, 1603), fols.167*v*–168*r*	Seven-course lute (French lute tablature)
Banchieri	'La battaglia'	Adriano Banchieri, *L'organo suonarino, opera ventesima quinta* (Venice, 1611), pp.38–9.	Organ (mensural notation)
Fuhrmann	'Praeludium Auff die Schlacht vor Pavia. Mercurii'; 'Schlacht vor Pavia/Mercurii'/'LAe G[ue] rre. M.' [*sic*]	Georg Leopold Fuhrmann, *Testudo Gallo-Germanica* (Nuremberg, 1615), pp.184–90.	Eight-course lute (French lute tablature)

replicate one another *verbatim* but also differ on a number of musical details. Banchieri begins with a passage of simple two-part polyphony (ex.1b) and Negri omits any introductory section altogether. From their incipits alone, it would be difficult to identify these four pieces as a closely related group.

The first point of intersection between the group as a whole follows: a distinctive triadic figure (a 3rd–5th–3rd–tonic contour) suggestive of trumpet calls and found in countless other contemporaneous battle pieces (ex.2). However, each of the four pieces presents a slightly different version of this material and, in each case, then develops it further through additional decorated repeats. This localized concordance between these sources illustrates how surface decoration can drastically alter the appearance of musical features which nevertheless retain their underlying similarity.

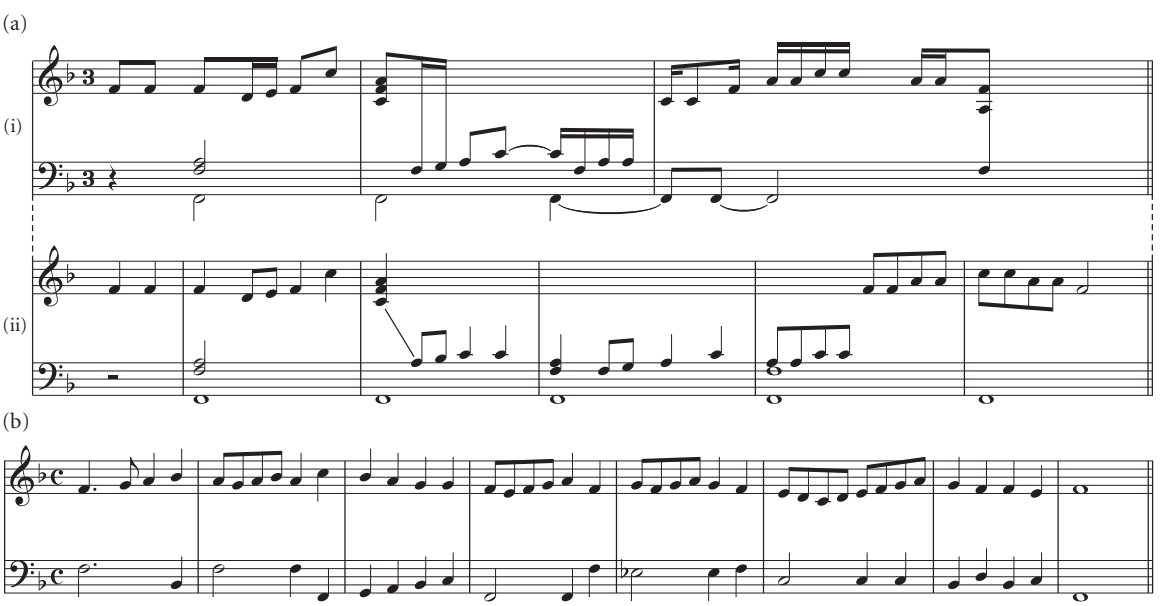
Besard and Fuhrmann then employ a distinctive 'arch-shape' motif, a larger-scale triadic gesture starting in the lower register and ascending by over two octaves before descending again (ex.3). Banchieri and Negri eschew this here, initially focusing on simpler triadic material over a tonic bass before exploring similar patterns over a dominant pedal (an unusual occurrence, in this genre at least).

Table 2 Schematic overview of four related battle pieces

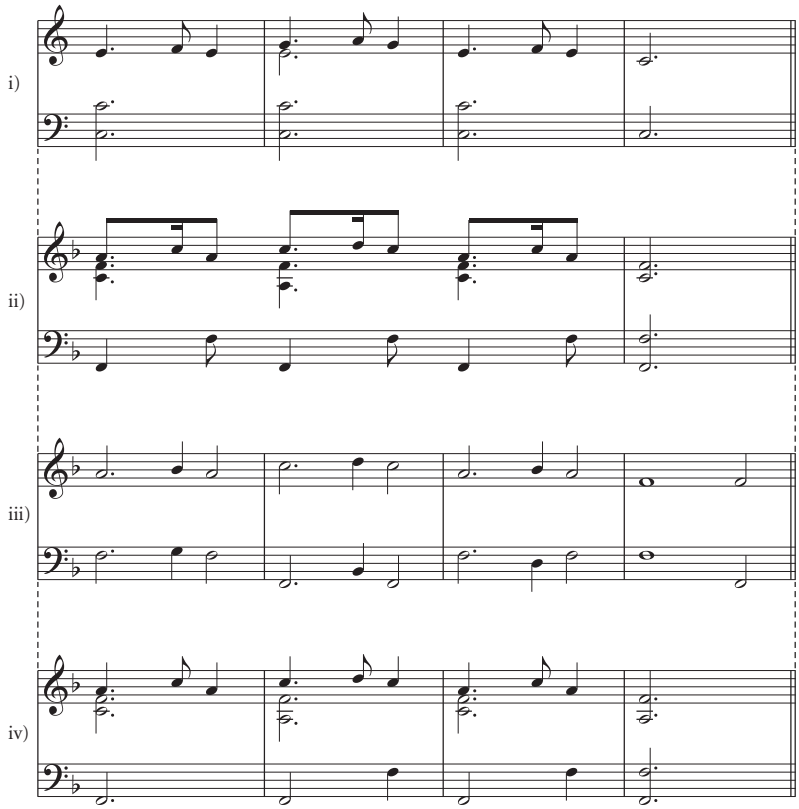
(i) Negri		C	D	D (on dominant)	G	E + H	D	
(ii) Besard	A	C	E	D	F	H	D	
(iii) Banchieri	B	C	D	D (on dominant)	G	E	B	
(iv) Fuhrmann	A	C	E	D	F	H	D	+150 bars
	[*Praeludium*]							

Key:
A, opening material (= ex.1a); B, two-part polyphony (= ex.1b); C, triadic (3–5–3–1) motif (= ex.2); D, triadic material; E, 'arch-shaped' triadic motif (= ex.3); F, quotation of *La girometta* (= ex.4); G, trumpet-style *rotta* motif (= ex.5); H, fife and drum (= ex.6). In all of the ensuing music examples, we have retained original note values and barring.

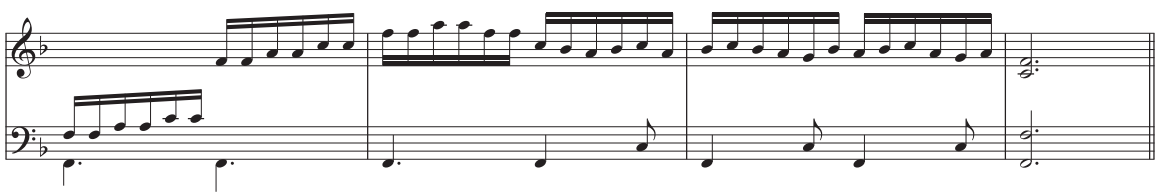
Ex.1 (a) (i) opening of Besard; (ii) opening of Fuhrmann, (b) opening of Banchieri



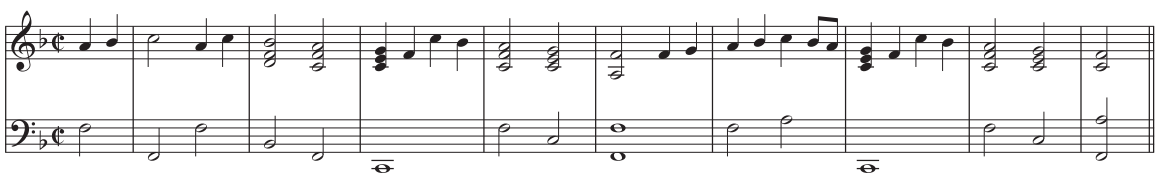
Ex.2 triadic motif: (i) Negri (lute part only); (ii) Besard, (iii) Banchieri, (iv) Fuhrmann



Ex.3 'Arch-shaped' triadic motif (from Besard)

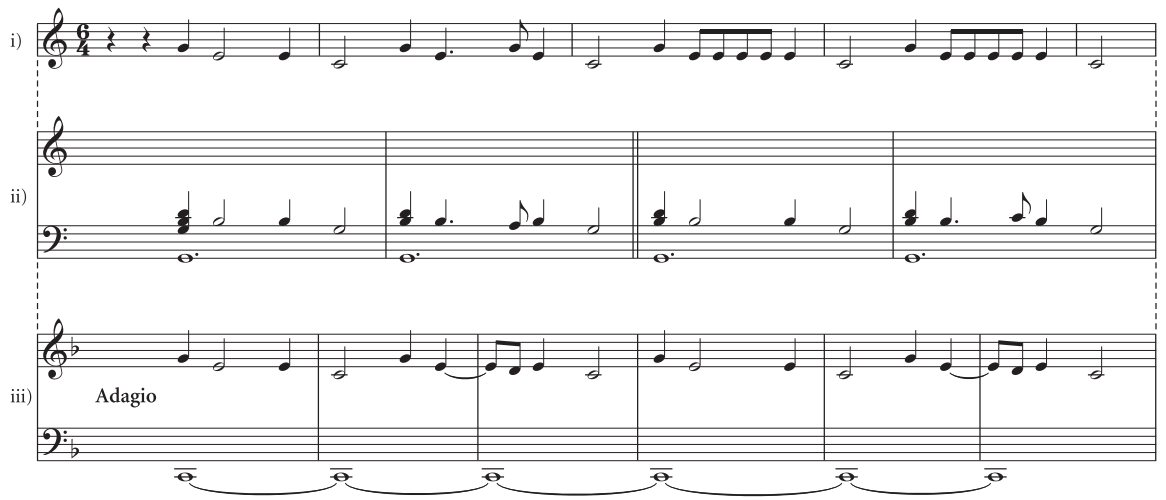


Ex.4 Quotation of *La girometta* (from Fuhrmann)



It should be becoming clear by now that these four pieces often diverge into two closely related pairs: the two Italian works and the northern European lute pieces. Certainly, the latter pairing exhibits one of the most distinctive features of programmatic 'battle music': the quotation of existing

Ex.5 Trumpet-style *rotta* motif: (i) Fantini, *Modo per imparare* (1638), 'Rotta' (p.19); (ii) Negri, (iii) Banchieri



popular melodies, in this case the Italian folksong *La girometta* (ex.4).[17]

Meanwhile, Negri and Banchieri present new triadic material instead and, in doing so, display a certain amount of notational confusion; this passage makes much more sense when parsed in triple metre with an anacrusis (ex.5). This section alludes again to the sound of trumpets, displaying a striking resemblance to a *rotta* (a set form of trumpet ensemble music) later codified by the Italian trumpeter Girolamo Fantini (1638).[18] The emulation of trumpet music is an obvious mimetic strategy to pursue in this context, of course, and the grammatical confusion in Negri and Banchieri perhaps indicates the role of aural/oral transmission of musical ideas during the compilation of these pieces.

Finally, three of the four examples include an illustrative 'fife and drum' section, something also seen in numerous other battle pieces. Rather than a purely melodic element, however, this is what we term a *compound feature*—that is, a feature whose identity is forged through a combination of some (or all) of the following characteristics: a ponderous underlying rhythmic ostinato (representing soldiers' drums); static tonic harmony; a faster-moving and largely conjunct treble melody (= fifes); a descending sequential pattern leading to the final cadence (ex.6).

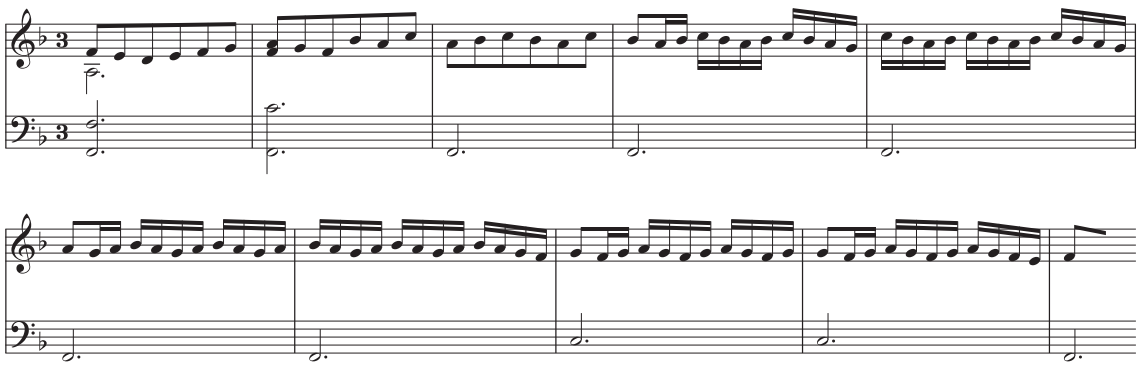
Following this, these four battles diverge one last time. Besard concludes with a brief arpeggiated flourish underlining the tonic triad, whereas Negri seems rather tonally confused, cadencing in the 'wrong' key (the supertonic minor, in modern terms). Banchieri concludes with a straightforward reprise of the opening passage, whilst Fuhrmann still has approximately 150 bars to go...

These four pieces are clearly related but, rather than derivatives of a single earlier archetype, they represent very different realizations of the same 'gist', apparently reshaped through various processes of oral, aural and textual transmission. Crucially, these pieces reveal numerous localized connections—shared motifs, melodies, harmonic and textural features, as well as complex compound features—although the degree of exact replication between them is actually very low indeed. Rather than viewing them as 'concordances', the concept of 'family resemblance' formulated by Ludwig Wittgenstein is a useful one here, whereby a group of entities display 'a complicated network of similarities overlapping and crisscrossing: sometimes overall similarities, sometimes similarities of detail'.[19]

Implications

This case study illustrates the kinds of relatedness and variance that can be seen between members of musical 'families'. These types of relationships have historically been poorly served by printed catalogues and other finding aids. Whether digital tools can change this situation, however, will depend on how they respond to the various weaknesses exhibited by more traditional resources.

Ex.6 'Fife and drum' passage (from Fuhrmann)



First, such tools must be able to recognize both global-level and localized similarity, and to refer clearly to different units of musical transmission (ranging from whole works down to tiny motivic cells) as primary objects of study.[20]

Second, a broader definition of what constitutes a 'match' needs to be developed, using similarity judgements based on factors besides melodic content, i.e. by comparing rhythmic, textural and harmonic features, and considering the effect of musical variation techniques on melodic material.[21] And, even as we strive to represent musical content according to its notated form, we must also remember that musical similarity does not necessarily need to stem from textual similarity: these four battles, whose level of strict textual concordance is very low, nevertheless retain a significant degree of similarity when experienced on a purely auditory level.

Third, users of digital resources should be able to construct a line of enquiry from multiple features, building up a credible set that together characterize a musical family—even though no single one of those features needs to be present in *all* desired 'matches', nor necessarily absent in all non-matches.[22] Indeed, it should be noted that these four battles, whilst interrelated, are also nodes in a much broader intertextual web of cross-references and allusions between other battle pieces and works belonging to other genres.

Finally, although much of our discussion here has focused on musical similarity, additional problems posed by metadata need to be factored into the design of digital resources. As Eleanor Selfridge-Field has pointed out, the assumption that works which share associated metadata (for example, titles, composer ascriptions) will also be closely related musically is a flawed one.[23] Our example adds further weight to this: although these four works have much in common, a crude string-matching-type metadata search would have had difficulty locating them as a 'cluster' since their titles use three different European languages. More problematically, two of those titles refer to the Battle of Pavia (1525), creating a somewhat misleading paratextual link with a related group of pieces derived from Mathias Werrecore's vocal work *Die Schlacht vor Pavia* (1544).[24] Since their musical connections with that particular subgenre are negligible, this is a conceptual link rather than a content-based one—another kind of interconnection that digital resources ought to be able to process.

Conclusions

Although our sample group of early 17th-century battles revealed a meagre degree of global-level similarity and exact textual replication, their collective identity (as related 'battle pieces') remains clearly defined. However, the somewhat fuzzy conception of musical similarity we have explored throughout this article is not, it should be stressed, unique to the *battaglia* genre. For example, recent research on the polyphonic fantasia and ricercar has shown how 16th-century lutenists freely adopted and modified passages from earlier exemplars,[25] whilst analytical studies of keyboard works by Frescobaldi and his early 17th-century contemporaries have detected a similarly flexible attitude towards musical content.[26] In both cases, those repertories are characterized

by numerous partial concordances between pieces (again, the by-product of shared vocabularies of motivic gestures and textural processes) rather than the transmission of entire 'works'.

This broad-ranging and complex spectrum of musical relatedness poses probing questions about the validity of designing musicological resources (digital or otherwise) in which the 'work-concept' and proprietary composer-centred models of musical transmission are still ingrained. Instead, we need to develop multidimensional paradigms for musical representation and similarity—representing the overall structural forms of pieces as well as their more localized details, and identifying exact duplication as well as much looser relationships between texts. Although as a genre the instrumental *battaglia* has attracted numerous detractors, it can nevertheless teach us a great deal about the ways in which musical material was conceptualized and transmitted by early modern musicians. Furthermore, it serves as a useful test case against which the efficacy of emerging digital technologies can be gauged.

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1 For an illuminating discussion of these instruments' roles in early modern auditory culture, see C. Marsh, *Music and society in early modern England* (Cambridge, 2010), especially pp.159–62. The most thorough exploration of the repertory of 16th-century trumpet ensembles remains P. Downey, 'The trumpet and its role in the music of the Renaissance and the early Baroque' (PhD diss., Queen's University, Belfast, 1983). On the emulation of trumpet music in various instrumental battle pieces, see M. Gale, 'Remnants of some late sixteenth-century trumpet ensemble music', *Historic Brass Society Journal*, xiv (2002), pp.115–31.

2 One significant exception is lutenist Elizabeth Kenny's 2009 recording *Flying Horse: Music from the ML Lutebook* (Hyperion CDA67776), which includes an eight-minute example.

3 V. Coelho and K. Polk, 'Instrumental music', in *European Music 1520–1640*, ed. J. Haar (Woodbridge, 2006), pp.526–55.

4 A. Silbiger, 'Fantasy and craft: the solo instrumentalist', in *The Cambridge history of seventeenth-century music*, ed. T. Carter and J. Butt (Cambridge, 2005), pp.426–78, at pp.472–3.

5 F. Hammond, *Girolamo Frescobaldi: his life and music* (Cambridge, MA, 1983), p.212.

6 D. Poulton, *John Dowland* (London, 1972, 2/1982), p.140. Poulton is describing the same piece cited here in n.2; evidently it *can* be brought to life.

7 D. Beck, *Spiegel van mijn leven: een Haags dagboek uit 1624*, ed. S. E. Veldhuijzen (Hilversum, 1993), p.174.

8 R. Hatten, 'The place of intertextuality in music studies', *American Journal of Semiotics*, iii/4 (1985), pp.69–82.

9 C. Meyer (ed.), *Sources manuscrites en tablature: Luth et théorbe (c.1500–c.1800): catalogue descriptif*, 4 vols. (Baden-Baden, 1991–9).

10 *Répertoire International des Sources Musicales* (http://opac.rism.info).

11 For example, H. Barlow and S. Morgenstern, *A dictionary of musical themes* (New York, 1948).

12 H. M. Brown, *Instrumental music printed before 1600: a bibliography* (Cambridge, MA, 1965), p.6.

13 Brown, *Instrumental music*, pp.7–8.

14 Brown, *Instrumental music*, p.7.

15 A more detailed study of the instrumental *battaglia* (and related genres such as the *barriera*) is currently in preparation.

16 For instance, Lionel de la Laurencie noted links between the Besard, Negri and Banchieri pieces, although he was apparently unaware of Fuhrmann's related 'Schlacht vor Pavia'. See 'Les

Luthistes Charles Bocquet, Antoine Francisque et Jean-Baptiste Besard', *Revue de Musicologie*, vii/19 (August 1926), pp.126–33, at p.131.

17 On the widespread use of *La girometta* in other battle pieces (especially as an allusion to the sound of the trumpet corps), see Gale, 'Remnants', pp.117–22.

18 Girolamo Fantini, *Modo per imparare a sonare di tromba* (Frankfurt, 1638), p.19, facs. ed. E. Tarr (Nashville, 1978), p.19. For a variant of this *rotta*, sharing the same melodic contour but using a different pitch-set, see p.12.

19 L. Wittgenstein, *Philosophical investigations*, trans. G. E. M. Anscombe (Oxford, 1968), #66.

20 Important computer-assisted studies of this kind include I. Knopke and F. Jürgensen, 'A system for identifying common melodic phrases in the Masses of Palestrina', *Journal of New Music Research*, xxxviii/2 (2009), pp.171–81; and, more recently, S. Sela and R. Y. Granot, 'Automatic extraction and categorization of Faenza Codex figurations', *Early Music*, xlii/4 (2014), pp.559–66.

21 These warnings have been raised before but remain largely unheeded; for example, D. Byrd and T. Crawford, 'Problems of music information retrieval in the real world', *Information Processing and Management*, xxxviii (2002), pp.249–72; E. Selfridge-Field, 'Search engines for digitally encoded scores', *Early Music*, xlii/4 (2014), pp.591–8.

22 For a theoretical model for this kind of data-searching, see D. Lewis, T. Crawford, G. Wiggins and M. Gale, 'Abstracting musical queries: towards a musicologist's workbench', in *Computer Music Modeling and Retrieval: Third International Symposium, CMMR 2005*, ed. R. Kronland-Martinet *et al.* (Heidelberg, 2006), pp.249–58.

23 E. Selfridge-Field, 'Social cognition and melodic persistence: where metadata and content diverge', in *ISMIR 2006: 7th International Conference on Music Information Retrieval*, ed. K. Lemström, A. Tindale and R.Dannenberg (Victoria, 2006), online at http://ismir2006.ismir.net/PAPERS/ISMIR0625_Paper.pdf (accessed 25 April 2015).

24 Published in Wolfgang Schmeltzel, *Guter, seltsamer, und künstlicher teutscher Gesang* (Nuremberg, 1544).

25 V. Coelho, 'Authority, autonomy, and interpretation in seventeenth-century Italian lute music', in *Performance practice on lute, guitar, and vihuela: historical practice and modern interpretation*, ed. V. Coelho (Cambridge, 1997), pp.108–41; V. Coelho, 'The reputation of Francesco da Milano (1497–1543) and the ricercars in the *Cavalcanti Lute Book*', *Revue Belge de Musicologie*, l (1996), pp.49–72.

26 See A. Silbiger, *Italian manuscript sources of 17th-century keyboard music* (Ann Arbor, MI, 1980), pp.63–70; D. Schulenberg, 'Some problems of text, attribution, and performance in early Italian Baroque keyboard music', *Journal of Seventeenth-Century Music*, iv/1 (1998), http://sscm-jscm.org/v4/no1/schulenberg.html (accessed 25 April 2015).