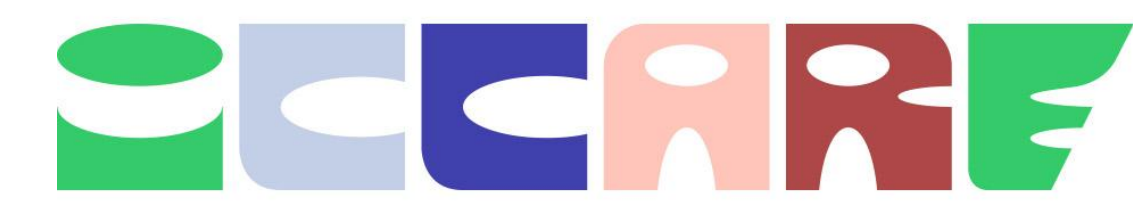




Modelling Flute Difficulty through a Corpus of Annotated Scores

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Estimating flute difficulty supports level-appropriate teaching and learning by making the technical and musical challenges explicit.

We propose: An annotated flute corpus with **expert teacher ratings** and **syllabus references across countries**, analysed via symbolic features to model and predict difficulty.

1. Grading Systems

RCM Canada/US	ABRSM UK	Trinity UK	CMF France	CCOM China
Prep A	Initial	Initial	Initial	1
Prep B	1	1	1C1	2
1	2	2	1C2	3
2	3	3	1C3	4
3	4	4	1C4	5
4	5	5	2C1	6
5	6	6	2C2	7
6	7	7	2C3 (2C4)	8
7	8	8	3C1-2	9

Approximate equivalences

2. Corpus

- ◆ 69 public-domain flute pieces annotated by teachers
 - 30 pieces by Popp
 - 39 pieces from Syllabi
- ◆ 5 grading systems
ABRSM, Trinity, RCM, CCOM, French (Section 1)
- ◆ 2 annotation strategies
with reference grades and/or teacher evaluations

ID & Filename

Your Rating

Preview

A

ccom - 1

abrs - 1.5

french - 1C1-2

10. GRADE: 3

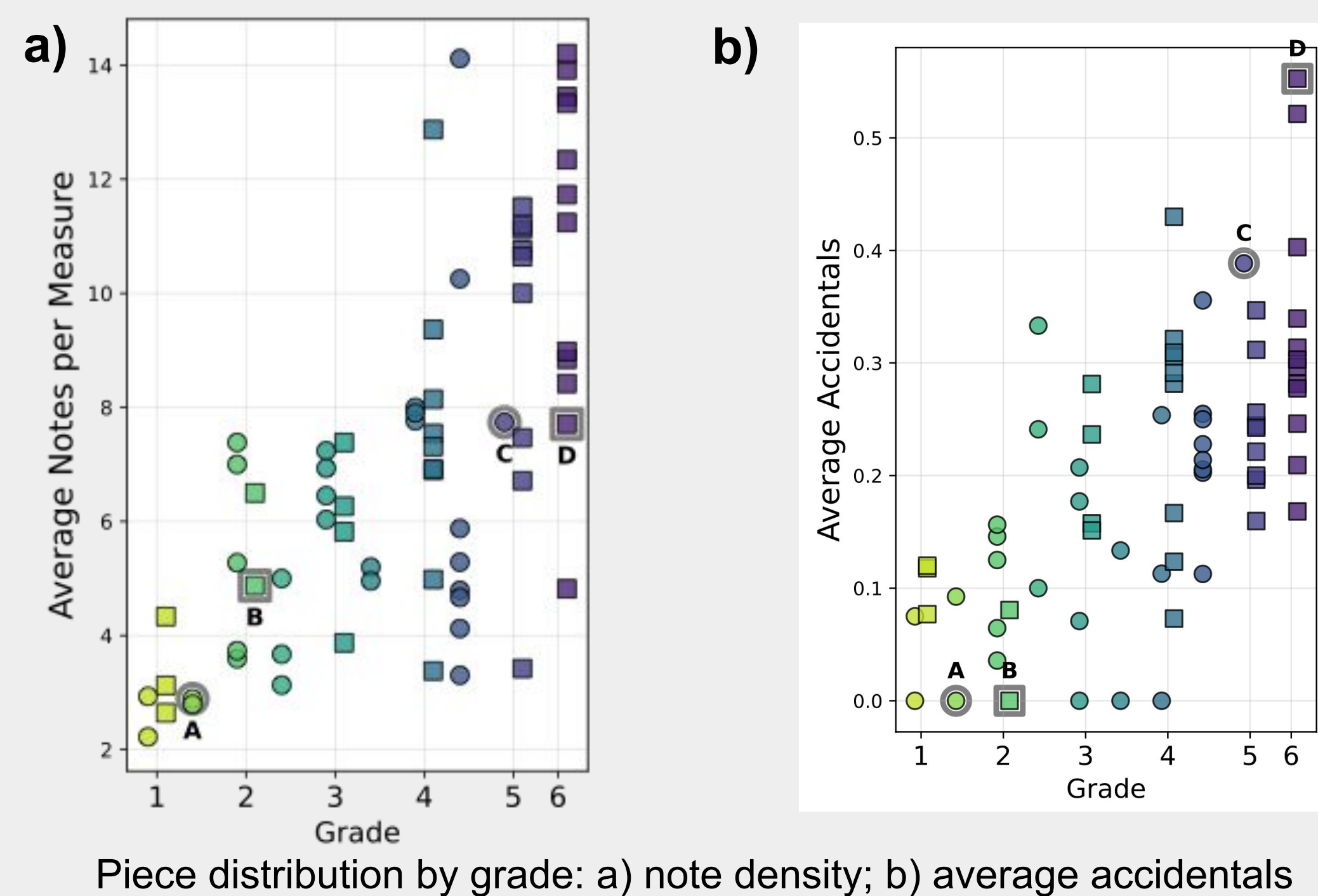
Syllabus: ABRSM | Composer: Giuseppe Gariboldi

Study No. 7 from Thirty Easy and Progressive Studies

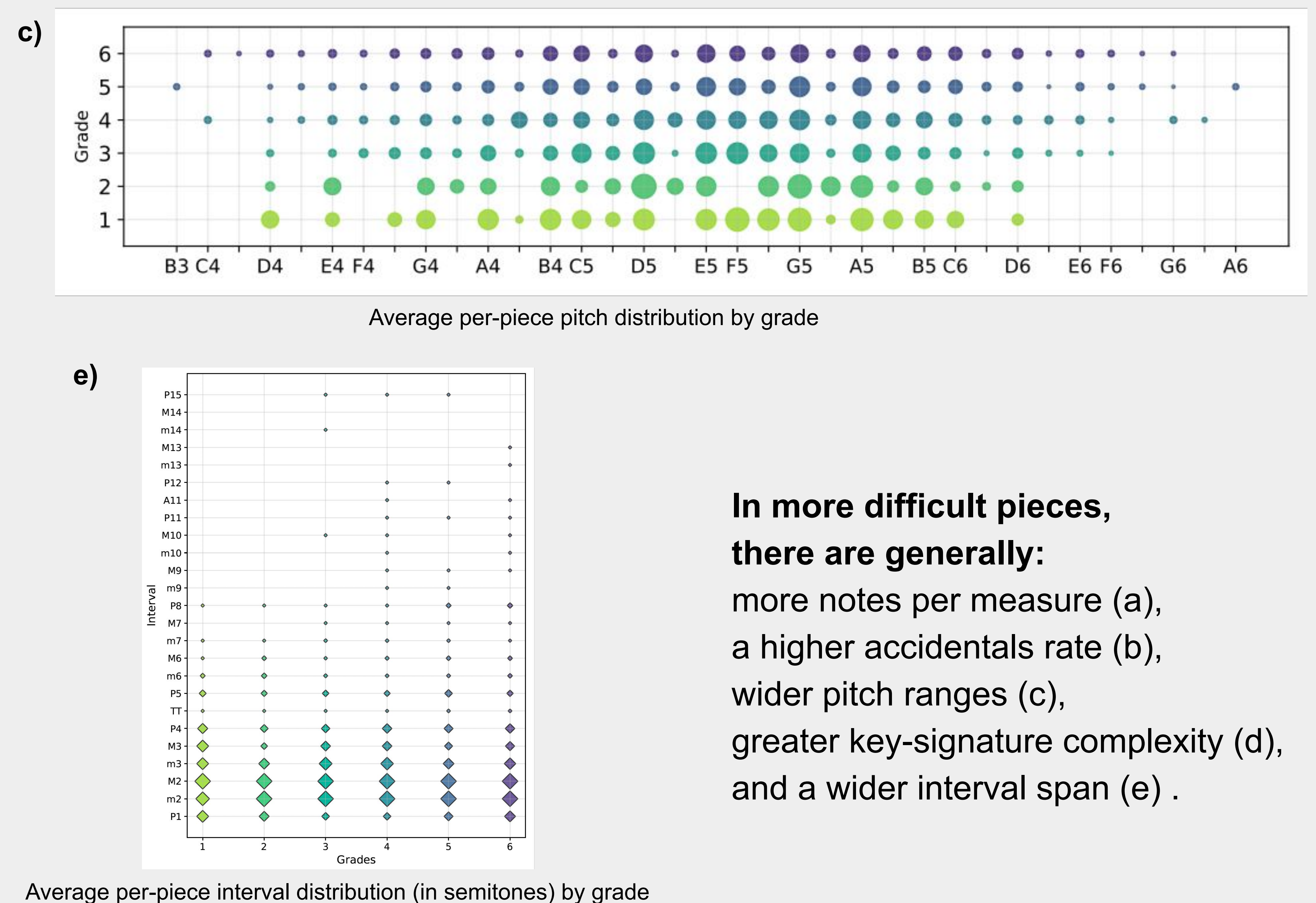
Allegretto

pe cresc. un poco

Human annotation examples



3. Features Behind Difficulty



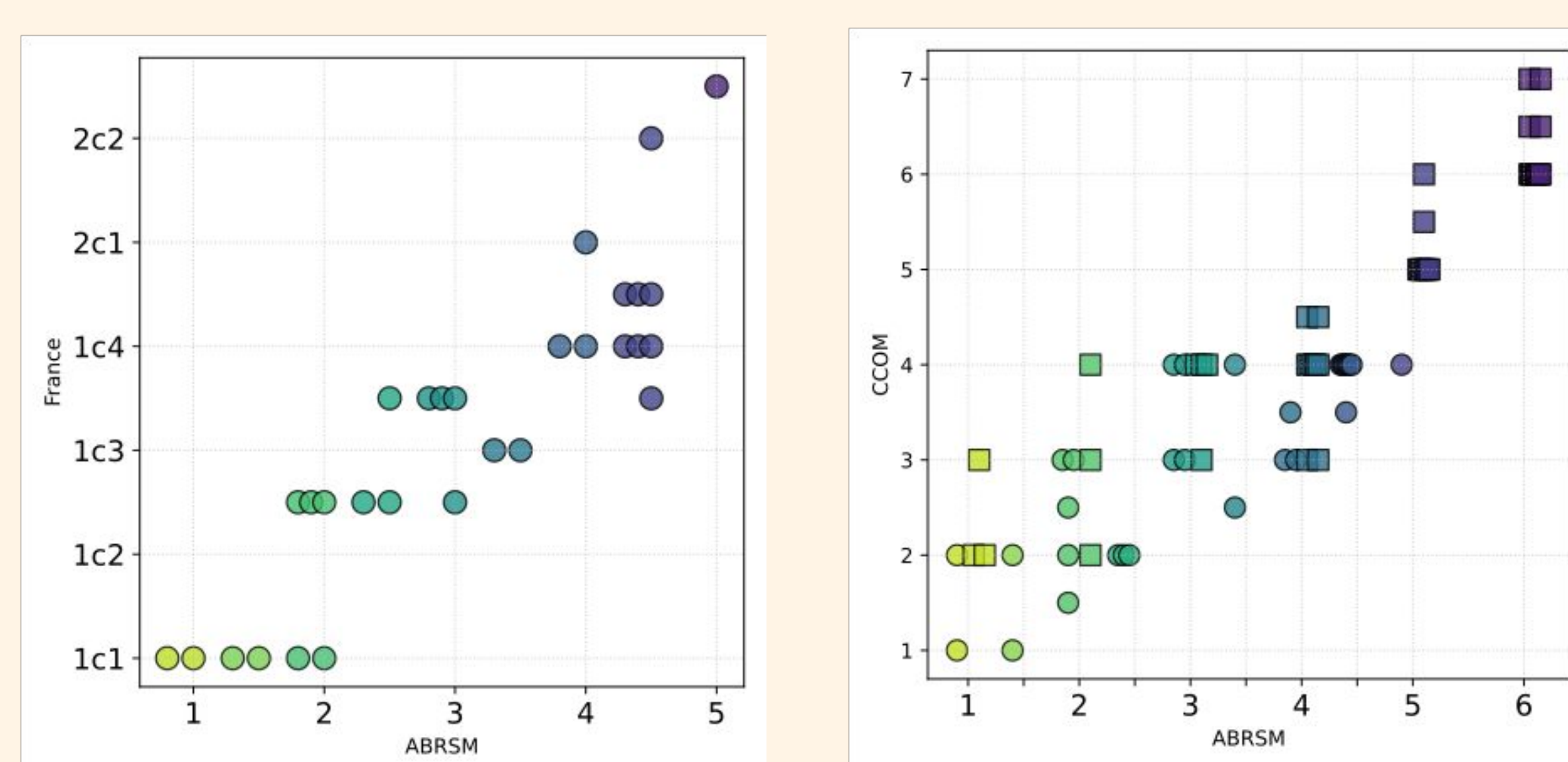
In more difficult pieces, there are generally:
more notes per measure (a),
a higher accidentals rate (b),
wider pitch ranges (c),
greater key-signature complexity (d),
and a wider interval span (e) .

4. Prediction Baseline

k-NN classifier on 8 features
(5 shown in Section 3).
Evaluated with leave-one-out
cross-validation (LOOCV).

Accuracy:
34.8% exact
76.8% within ± 1 grade

5. Cross-system Insights



ABRSM vs. CMF/CCOM

6. Next steps

- **Extend corpus:** more instruments, teachers, pieces (esp. beginner), measure annotator agreement.
- **Model finer features:** alternative fingerings, articulation, dynamics, triplets, breathing.
- **Generative support:** meta-arrangements conditioned on difficulty.

