

Talking fingers: an interview study of pianists' views on fingering

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• ABSTRACT

Seven professional pianists were interviewed to gather their views on various aspects of piano fingering. The issues covered included technical considerations, the influence of interpretation and composers' markings on fingering, the effects of different performance circumstances, and the role of teachers in determining fingering strategies. An analysis of the participants' responses revealed both a considerable amount of common ground in their attitudes to these matters, and some strikingly different attitudes. Five primary themes emerged: i) while standard fingerings form the basis for these performers' strategies, a greater use of standard fingerings in sight-read as opposed to rehearsed or memorised performance was predicted by the participants; ii) those performers with a deeper involvement in, and earlier exposure to, contemporary music considered themselves to have a less standard approach to fingering; iii) physical considerations not only represent constraints on fingering, but also offer opportunities to employ positively pleasurable fingerings which may be highly idiosyncratic; iv) while interpretation is universally regarded as the primary determinant of finger choice, attitudes range from a refusal to contemplate a fingering until musical matters have been resolved to the belief that a single best fingering can be found onto which interpretative choices are mapped; v) the participants appear to have good declarative knowledge of the more abstract and strategic aspects of their approach to fingering, and essentially procedural knowledge of what they do in any particular circumstance, as found in previous research on motor skill.

INTRODUCTION

Musical performance is arguably one of the most sophisticated and complex skills that human beings can acquire, combining a range of highly specialised mental skills with physical skills that must be acquired and developed over many thousands of hours of practice (Ericsson, Krampe and Tesch-Römer, 1993). Psychologists and music theorists have shown considerable interest in the cognitive characteristics of musical performance in recent years (e.g. Clarke, 1988; Dunsby, 1995; Rink, 1995; Sloboda, 1982), and in the more abstract aspects of performance as a motor skill (e.g. Palmer, 1989; Shaffer, 1981). However very little attention has been paid to the most concretely physical component of the whole process, with the exceptions of Baily (1985), Davies, Kenny and Barbenel (1989) and perhaps Truslit (reported in Repp, 1993) - none of which deal with piano fingering. Every musical instrument presents its characteristic and unique physical challenges to a prospective performer, and thus its own issues of interest to psychologists. The piano, and other keyboard instruments, offer a particularly rich opportunity to investigate the actions and organisation of the fingers, because of the very flexible relationship between the note(s) to be played and the finger(s) that may be used: there is essentially a complete lack of determinacy here, any one of the ten fingers being in principle a possible candidate to play any note on the keyboard considered in isolation (though there may be a tendency to use a strong finger, such as the second or third finger, in such an isolated context). The constraints come from the context in which any particular note is embedded, coupled with the particular characteristics of any individual pianist's hands and fingering concepts.

This paper is part of a large-scale collaborative project investigating pianists' fingering strategies, the project as a whole encompassing a range of quantitative and qualitative approaches to the issue. While there is a sizeable pedagogical literature on various aspects of piano playing, including discussion of fingering, there has been virtually no systematic study of this crucial skill, the literature tending towards a reasoned but essentially prescriptive account of how to optimise a variety of practical issues. While the aims of other parts of the current project are to gather quantitative data on such issues as the consistency, reliability, and expressive consequences of fingerings, the purpose of this paper is to gather qualitative data on what professional pianists think they do when they play. This will provide background and context for the more narrowly focused experimental components of the project, and may provide important hypotheses for later parts of the project.

A limited number of similar qualitative studies of musical skill exists, most notably Hallam (1995) and Miklaszewski (1989). Hallam (1995) looked at professional musicians' strategies for learning and practising music, using a semi-structured interview technique that has similarities with the approach adopted here. Miklaszewski's paper (Miklaszewski, 1989) is a case study of a piano student preparing a piece for performance, who was videotaped during four practice sessions, and then

provided a taped commentary on the longest of these sessions. Again, the study reported here makes use of a related methodology in employing a mixture of visual and audio information. Finally, published interviews with a number of musicians exist which deal with aspects of interpretation and technique which are related to those addressed in this paper (e.g. Elder, 1982), though the approach is somewhat less systematic and narrowly focused than the one that we have tried to adopt.

METHOD

The decision was made to conduct structured interviews with pianists, who would be given the opportunity to illustrate any ideas at a piano¹. Since fingering styles may be different for music of different historical periods, and in order to provide a concrete focus for the interview, the third movement of the piano sonata in Bb K. 333 by W. A. Mozart was used as the reference example for the interview questions. The complete questionnaire, which is given in appendix 1, was sent to the pianists in advance and was used to structure the subsequent interview. While an attempt was made to keep to the pattern of the questionnaire during the interview, the pianists were free to elaborate on, or diverge from, the specific questions, and as a consequence different parts of the questionnaire received very different emphases. The interviews took place in a variety of rooms at the Universities of Sheffield and Keele, and on one occasion at the home of one of the participants. Each interview was conducted at a piano, lasted 60-90 minutes, and was recorded on video, the camera positioned so as to capture any illustrative fingerings at the piano keyboard.

• **Participants.** The participants were seven professional musicians (2 female, 5 male), all connected either directly or indirectly with the Universities of Keele or Sheffield, or through a personal contact with one of the four authors. All seven pianists, who range in age from their late twenties to their mid-forties, either are or have been active as professional public performers, three have made commercial recordings, and all either have, or have had, pupils of a variety of levels and ages. Three of the pianists are primarily freelance performers and teachers, while the remaining four have full-time academic posts. The freelance musicians were paid for their participation; those with full-time posts were not.

(1) Originally the intention had been to collect some of the material through written responses to a questionnaire sent out to participants. However it was soon clear that this would make considerable demands upon pianists, would almost certainly result in a very poor rate of return, and most importantly would preclude practical illustrations at the piano. Thus all the information was collected from face-to-face interviews.

• **Analysis.** Since the primary purpose of this study is to elicit pianists' opinions and attitudes on fingering, and to gather the material from which testable hypotheses might be generated, no attempt has been made to quantify any aspect of the participants' responses to the interview questions. Rather, this paper is concerned with the primary themes and the range of outlooks that emerge. The analysis of the data proceeded as follows. The first author made a detailed chronological transcript of the content of each video, consisting of a record of the summarised content of each participant's utterances, and verbatim transcript whenever a participant expressed an idea in a form of words that seemed particularly striking. Where appropriate, the actual fingerings used to illustrate a point at the piano were also recorded. From this first chronological transcript, a second thematic transcript was made, grouping together the records of attitude and opinion, and verbatim expressions, according to emergent themes in a more synthetic manner. These themes were, for obvious reasons, closely related to the original questionnaire, but new categories of theme were created for each participant whenever they seemed necessary from the contents of the first transcript. The number of categories ranged from 7 to 11 for the seven pianists, and the category headings are shown in table 1.

Table 1

The table shows category headings from the thematic transcripts for the seven pianists, with bracketed numbers indicating the number of pianists providing material under the heading.

A. Teachers and pupils (7)	H. Finger character (3)
B. Standard fingerings (7)	I. Physicality (3)
C. Black keys (7)	J. Options (1)
D. Pedalling (7)	K. Unconscious/Instinct (1)
E. Tempo (7)	L. Risks/Security (1)
F. Interpretation, composers' markings (7)	M. Ergonomics (1)
G. Sight reading, rehearsing, memory (7)	

RESULTS

The participants' comments and observations are presented under five broad headings: Technical Issues; Ergonomic, Physical and Cognitive Factors; Interpretation and Composers' Markings; Performance Factors; and Teaching and Learning.

• **1. Technical issues.**

a) Standard Fingerings and Consistency

One of the issues raised in the original questionnaire concerned the use of prescribed, or 'standard', fingerings for stereotyped passages, such as scales and arpeggios. In Britain, the Associated Board of the Royal Schools of Music publishes a

Manual of Scales, Arpeggios and Broken Chords for Pianoforte (ABRSM Publishing, no date) with recommended fingerings. The manual makes it clear that in ABRSM examinations, candidates are not obliged to keep to these fingerings, but that these provide a basis for good technique. Similarly in a recent publication, Roskell (Roskell, 1996) states that "A good understanding of the principles of fingering scales and arpeggios is the best possible introduction to fingering pieces of music", but that "the most obvious or most simple fingering is not always the best for achieving a particular subtlety of phrasing or expression, and fingerings need to be adapted to suit the special character of each piece." (Roskell, 1996, p. 1). The extent to which such 'standard' or scalebook fingerings are used in the complex music of high-level performance is thus open to question, but a reasonable starting assumption is that most pianists begin by learning standard fingerings from which more individual approaches may evolve.

All seven participants endorsed the utility of standard fingerings, and confirmed that they made use of standard fingerings themselves, and used them in their teaching. Behind this apparent uniformity of opinion, however, lies a significant range of attitudes. While one participant described standard fingerings as "full of common sense...full of pianistic truths", he and virtually every other participant also observed the need to adapt fingerings to the local context. Different views were expressed concerning the use of the same fingering in parallel musical passages: two participants stated that they try to use the same fingering where possible, one claiming that "with parallel passages, and with repetitions, you should use the same fingering if you can, because it helps to organise...for a pupil it organises their mind". Other participants observed the need to adapt fingering to the changing physical context (essentially reducible to the disposition of black and white keys), and thus the inadvisability of trying to retain the same fingering in parallel passages. One participant claimed that he certainly made no attempt to use the same fingering and that there might even be mental advantages to using deliberately different fingerings - presumably on the grounds that it might help to avoid memory confusions between similar passages. Similarly, another observed that non-standard fingerings were sometimes useful to hold back the tempo of a passage, or to introduce an intentional sense of deliberation. Finally, one participant commented on the need to balance the economy of standardisation against the ideal of freshness in performance: "I had 2 years when I did what I liked as a boy, and I still have got some of that left in me somewhere - just do it any old how. In the end, music must sound fresh, and when we practise it gets less and less fresh. It's a balance."

b) Black keys

The general consensus amongst the participants was to avoid the use of the right hand thumb², and to a lesser extent the fifth finger, on black keys in 'horizontal' (i.e.

(2) Because the questionnaire was rather strongly focused on right hand fingering, only the right hand thumb is discussed here.

melodic) fingering. All seven pianists, however, acknowledged that there were situations where it was unavoidable, or even advantageous, to use the thumb: a particular example was horizontal (melodic) movement in parallel octaves, where one pianist commented that using the thumb and fifth finger allowed the hand to be kept at a constant fixed stretch (though many pianists might favour an alternation of the fourth and fifth fingers specifically to avoid a rigidly fixed stretch). Equally another of the participants, who stressed the importance of the thumb to him and his enthusiasm for fingerings which made extensive use of the thumb, identified a context in which he would deliberately use the thumb on a black key for greater control and in order to produce a more robust sound. This was at the beginning of the third movement of the Mozart sonata K. 333 (used as the example piece for the questionnaire), where he used a 4, 2, 1, 1 fingering in the right hand for the first four notes (see figure 1), whilst acknowledging that 5, 3, 2, 1 was equally possible.



Figure 1. The opening bar of the third movement of Mozart's piano sonata in Bb major, K. 333, showing the repeated use of the thumb on a black key (Bb).

Indeed he went on to remark that the "flimsier" sound that this latter fingering produced might be appropriate for the theme when it occurred later in the movement, but that he wanted this more robust fingering to "make a more positive statement" of the material at the beginning.

c) Pedalling

A range of opinions was expressed on whether the use of the sustaining pedal affects fingering. At one extreme, participants stated that pedalling did not, and should not, affect fingering, the two being ideally independent. On the other hand, others recognised that a decision to use a different amount of pedal (for interpretative reasons, or as a response to a different performance acoustic) might often have consequences for fingering.

d) Tempo

The broad consensus among the participants was that tempo did affect fingering, and that at slower tempi there was less demand for 'economical' fingerings and more opportunity to use deliberate, and what one pianist described as "intrusive", fingerings. In order to be of any use, the fingerings used in slow practice should be

the same as those to be used at full speed. It was also observed that since tempo is part of the conception of a piece of music, and the primary influence on fingering is interpretation, it was inevitable that tempo would influence fingering.

• 2. Physical and cognitive factors.

In addressing what might be broadly characterised as physical and cognitive considerations in fingering (i.e. the physical qualities of the hands and their relationship to the keyboard, and the relative complexity of different finger patterns), the seven participants identified a number of related issues. On the one hand there was considerable (and predictable) consensus that physical ease and comfort are an important factor in deciding a fingering. As one participant put it: "I can't express a good musical idea if I'm not feeling comfortable". But it was also evident that fingering can be a source of physical pleasure: one of the participants (the same as the individual mentioned above who would deliberately use the thumb on a black key in the Mozart) has a particular predilection for the use of the thumb, and identified situations in which he might use the thumb unnecessarily simply because he enjoys the sensation: "The thumb is like a security thing: it's a lovely feeling. The thumb is as much as the other four fingers - it's half a hand". Another participant commented on the physical pleasure of fingerings at slow tempo that use finger changes on the same note, and also mentioned the virtue of deliberately using non-standard fingerings to "wake your fingers up" - i.e. to heighten conscious awareness of what the fingers are doing.

Few of the participants had much to say about cognitive factors, though whether this is due to their perceived lack of importance, or simply their unavailability to introspection, is unclear. One participant commented that whilst he might have aimed at more standard and straightforward fingering solutions earlier in his career, he feels "more prepared now to set myself complicated learning tasks." By contrast, another commented that "You might have worked out a clever fingering, and then latched onto something very secure, like thumbs on beats. Even in a concert. Because the intended fingering didn't become a reality." This reflects the view, alluded to by more than one of the pianists, that there is an unconscious background of deeply ingrained finger habits to which one is likely to revert under situations of performance stress, or high task load (such as sight-reading): "The pressure of doing a performance changes things. You might have worked out to do something quite stunning and it just didn't materialise that way, and you do something very basic instead." There is no more information on what these deeply ingrained finger habits might be, but it is a reasonable assumption that they correspond very closely to the scalebook, or standard, patterns that represent the earliest foundation for most pianists' fingering strategies.

• 3. Interpretation and composers' markings.

All the participants made strong statements about the centrally important role of interpretation as a determinant of fingering, reflected in the following, from four different participants:

"[T]he fingering is actually the analysis of the interpretation...It's the interpretation that rules everything..."

"Everything is in the service of the music in an ideal world ... You want to make the character of the music what you feel it is, and the fingering must serve that sound."

"Fingering is entirely at the service of musical intention".

"I decide according to the musical idea."

Nonetheless there were considerable discrepancies in the degree to which, and manner in which, this seemed to be reflected in actual practice. At one extreme, one of the participants was not prepared to identify a fingering for the opening of the Mozart sonata movement used as the focus for the interview (see above) until he had sorted out what he wanted to do with the music, whilst another claimed "Given that I'm confident that I can get the articulation with whatever fingering I choose, it's a question of saying well what's going to lie most comfortably", and a third that the first step was to finger a piece and then to start to work on interpretation. One participant interestingly remarked that the organisation of the music implicit in a fingering is for the player's conceptualisation, not the listener's.

As far as composers' fingerings and hand distribution indications are concerned, the seven participants all agreed on the importance of paying attention to these indications, but again with significant differences of emphasis. One pianist stated that she would only go against a composer's fingering or distribution if it was absolutely impossible to use - and that even then she would want to know why it had been marked in that way. As an example of a composer's fingering that had important expressive consequences, one of the pianists cited Schumann's *In der Nacht* from *Fantasiestücke* where, in bars 11-12 Schumann indicates a [1], 2, [1], 2, [1], 2, [1], 2 fingering across eight descending semiquavers (see figure 2). The player comments that Schumann prescribes this fingering because "the effect he wants is hooves going away in the distance...more in twos, to contrast with the grouping in fours earlier on."

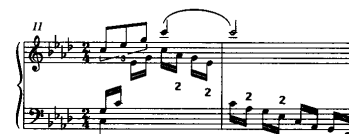


Figure 2. Bars 11 and 12 of *In der Nacht* (from *Fantasiestücke*, Op.12) by Schumann, showing Schumann's notated fingering.

The pianist acknowledged that this is a technically difficult fingering, and that he had a student who was currently learning the piece who wanted to play the passage (from the middle of bar 11) with the more straightforward fingering 1, 2, 3, 5, 1, 2, 3, 5, 1, 2, 3, 4, 5 but which "sounds completely different. Schumann says it takes more technical dexterity to do it his way because of the flexibility of the thumb, but



Figure 5. Bars 28 and 29 of the third movement of the piano sonata in Bb major, K. 333, by W. A. Mozart, illustrating the use of a different finger at the start of bar 29 at slow and fast tempi.

involves more hand movement than the slow tempo version, contrary to the reasonable prediction that pianists will economise on movement at higher speeds.

• 4. Performance factors.

In response to the questions about different modes of performance (sight-reading, rehearsed reading, memorised performance), a number of common themes emerged. All the participants who commented on it believed that they would use more conventional fingerings when sight-reading. As one participant put it: “In sight-reading you’re trying to predict the end of the pattern from the start of it, so assuming that that goes according to plan you’re then really predicting a longer fingering pattern, so therefore you’re going to tend to finger in longer groups as well...” And another: “[F]or sight-reading you will latch onto your infantile fingerings if your brain can’t go as fast as the fingers... You do the fingering which gives you the best chance of success. I would not put a thumb on black keys in sight-reading, more likely to do that after rehearsal.”

Rehearsing involves the identification of fingering alternatives, and experimentation with more unconventional fingerings until a preferred solution is found. Again, one of the pianists was at pains to point out that this process is inextricably bound up with the developing interpretation of the music: “If I start working at a piece, the fingering ideas I may have are very, very provisional, and would ideally wait several days before being solidified because it would be dependent on the musical picture that I was forming.” In general, the participants believed that there was very little difference between the fingerings used in rehearsed reading and memorised performance. The over-riding impression is that once a fingering is decided upon, these pianists stick to it. One of them recognised that he might occasionally revert to a previously learned fingering different from the current one, but that this would be something of an exception: “if you’ve done it a hundred times, you’re not going to change it. You’re going to do the familiar fingering, and if you thought of a better one, you’ll probably not do it because it might go wrong.” The same pianist observed that the only real difference between rehearsed reading and memorised performance might be the degree to which risky fingerings are used: “I would be more

likely to do [a riskier fingering] in memorised performance. You have less courage with the notes in front of you...”

Finally, fingering and the process of memorisation are closely linked, but none of these pianists seemed to believe that they chose fingerings specifically for their memorability: “You have to know the piece aurally, motorically, and visually: I don’t know which is most important. You have to know the music, and until you’ve done that it doesn’t matter how well you know the fingering. You’ve got to know the piece independent of the fingering.” And from another: “You just wouldn’t choose a fingering that was difficult to memorise in the first place.”

• 5. Teaching and Learning.

The final category of discussion concerns the influence of teachers on the participants’ fingering strategies, and in turn the participants’ attitudes towards their own pupils’ approaches to fingering. Not surprisingly, all the pianists acknowledged the influence of a teacher at some time in their development, but there were differences in the extent to which they considered that their current (adult) approach still reflected a teacher, ranging from those who considered their fingering still to be profoundly influenced by their teacher³ to individuals who regarded their current approach to fingering as essentially their own. Interestingly, the two who expressed this latter attitude most strongly are pianists who started playing contemporary music early in their lives, and both of them observed that contemporary repertoire, more than any other, renders standard fingering obsolete and requires a more creative approach.

In relation to their pupils, a range of attitudes is again apparent, though all the pianists acknowledged the need to offer advice on fingering, particularly at the earlier stages of development. In a striking remark, one of the participants stated: “I reckon that ultimately there is surely one best fingering for every passage and it’s a question of finding that best fingering, and so if I’ve got the best fingering, why not give my students the best fingering?”, while another, in direct contrast, said: “I wouldn’t dream of saying ‘this is the fingering - do it’”. Once again the relationship between fingering and interpretation offers a perspective on these differences: the participant who would never impose a fingering is the same individual who stressed the inextricable link between fingering and interpretation (see above), and who again in the context of teaching stressed that “the fingering is ideally an expression of the musical intention”, and that there is simply no point in trying to suggest or impose a fingering until the musical ideas have been sorted out. As another pianist put it: “It’s a type of thinking, a fingering, isn’t it: it’s a sort of ... code which is very peculiar to ... it’s very individual, isn’t it, ... and I think a pupil picks it up from you,

(3) Significantly the two pianists who expressed this view were both taught by the same person - Fanny Waterman - who is generally recognised in the UK as having been an extremely influential and powerful force in British piano pedagogy.

the codes, and they generally don't have much of a code yet. People don't think about fingering a lot, so you hope it rubs off a little bit, your way of thinking and then their own individual ways will creep in as well."

DISCUSSION

Five main themes emerge from this interview study, as follows:

- **1. Standard fingerings and task demand.** A number of the participants observed that the standard fingerings which they learned at an early stage in their development constitute the largely unconscious 'bedrock' upon which much of their more deliberate fingering is superimposed. Under conditions of high task demand (such as sight reading or the stress of public performance) there is a strong tendency to revert to these more primitive patterns. The principle can be expressed as the hypothesis that under conditions of high task demand, more standard fingerings will be used.

- **2. Standard fingerings and contemporary music.** Two pianists with extensive, and relatively early, experience of contemporary music expressed the view that they were less influenced by, or aware of, standard fingerings in any repertoire. Again this can be expressed as the hypothesis that the use of standard fingerings is related to a pianist's predominant repertoire, and that the more that this is contemporary, and the earlier was a pianist's involvement with contemporary music, the less will s/he use standard fingerings in both contemporary and traditional repertoires. This is a theme which the original questionnaire had not anticipated, and we are therefore restricted to the spontaneous remarks of two of the seven pianists. The generality of the hypothesis proposed here is thus impossible to predict.

- **3. Physical factors.** As one would expect, virtually all the participants mentioned ways in which physical constraints affect their fingering (the physical difficulty of particular hand positions or transitions between hand or finger positions; and the influence of physical comfort/discomfort on fingering choice), but a number also remarked on the positive physical pleasure that is associated with certain fingerings. The examples of idiosyncratic use of the thumb and of the pleasure of finger changes on the same note given earlier in the paper illustrate this point. A consequence of this is that any attempt to formalise general fingering strategies may have to recognise that an individual's approach may depart from the general pattern not only for reasons of physical constraint (hand size and flexibility, etc.) but also in order to maximise the use of specifically pleasurable fingering practices. It is questionable, however, whether this 'pleasure principle' is sufficiently predictable to play a role in any formal model.

- **4. Interpretation and fingering.** The general consensus amongst the participants was that interpretation is the primary determinant of fingering, and that in the specific case of composers' marked fingerings these are to be understood essentially as a guide to interpretation, rather than literal prescriptions. Cook (1990) discusses at some length the idea that fingering is the embodiment of an interpretation of the music, and that there has been a trend in 'modern' fingering (i.e. from about Liszt onwards) to try to divorce the technical element in fingering from its interpretative element: 'modern' fingering is an attempt to provide a musically neutral but technically optimal solution to getting around the notes, leaving the performer free to impose an interpretation on this subsequently.

"It is quite possible for a fingering to be more valuable for communicating an interpretation than for providing the best means to realize that interpretation; a performer might perfectly reasonably take note of Beethoven's fingerings, but then substitute his own, while still bearing Beethoven's suggested interpretation in mind. (One might say that the performer who understands Beethoven's fingerings has no need to adopt them, while for the performer who does not understand them, there is no point in adopting them)." (Cook, 1990, p. 81)

Similarly Bamberger (1976) proposes that fingerings are a means for the composer to indicate an interpretation of musical structure:

"[W]e must conclude that Beethoven provided fingering where he felt, at the moment, that this was the best way to explicate the structure and to communicate his expressive intent. Indeed, the fingering often occurs at moments of intense expressiveness, as part of a climactic event in the musical process; ... The fingering speaks directly and intimately, perhaps more so than any other device, since it communicates to the performer on the immediate level of physical gesture. Whether Beethoven's fingering is actually used by performers is not the crucial issue; rather, it is important that the fingering be understood and recognized by editors, performers, and students of his works not as an aid to technical facility but as an inseparable part of the music itself." (Bamberger, 1976, pp. 270-271)

Important though this point may be, the study reported here demonstrates that pianists, not surprisingly, also have a rather more practical concern with what they do at the instrument. Although the participants all agree on the central role of interpretation in determining fingering, it is clear that they are keenly aware of the basic but vital issue of finding a fingering that is comfortable, reliable, and effective. There is a considerable element of personal idiosyncrasy in defining exactly what makes a particular fingering fulfil these requirements, but it is also apparent that there is significant common ground in the 'standard use' that forms the basis for all of these pianists' practices.

• 5. **Procedural and declarative knowledge of fingering practice.** The pianists who took part in this study had clear views about the more strategic or abstract characteristics of their fingering (e.g. the relationship between interpretation and fingering, their approach to black keys, their attitude to teaching, etc.), and were quite capable of articulating them. To a somewhat lesser extent they also had declarative knowledge of what they do in different performance contexts (e.g. sight-reading, learning, memorised performance, etc.). But it was striking that as soon as they wanted to make a point or express an opinion about the fingering of a particular passage of music, they invariably turned to the keyboard to try it out and illustrate it. The more detailed knowledge of what they do with their fingers from note to note appears to be essentially procedural - a property of well-learned skills that has been recognised for some time (e.g. Miller, Galanter and Pribram, 1960; Anderson, 1982).

In conclusion, this study has brought to light some explicit and testable hypotheses about fingering (the relationship between task demand and standard fingering, and the relationship between a pianist's predominant repertoire and fingering strategy), and has also raised significant questions about the relationship between musical interpretation and fingering, the pedagogical question of instruction versus individual creativity in teacher/pupil relationships as they relate to fingering, and the balance between a pianist's explicit, declarative knowledge of fingering and the more procedural and implicit knowledge that is revealed through action at the piano. The more testable issues about standard fingerings are the subject of two other papers (Sloboda, Clarke, Parncutt and Raekallio, in press; Parncutt, Clarke, Desain, Raekallio and Sloboda, accepted), and a study of the impact of different prescribed fingerings on both measurable performance features (timing, dynamics and articulation) and listener responses - an issue that relates closely to questions of interpretation and composers' fingerings - is currently in progress.⁴

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Appendix 1: The complete questionnaire used in interviews with pianists.

The aim of the interview is to explore the principles and procedures used by present day pianists to determine fingering.

Fingering may, of course, vary considerably with musical style. Here, we focus on a single, well-known corpus of music. Unless otherwise stated, all questions apply primarily to piano music in the style of Mozart and his contemporaries, as it is performed today. Please refer in the first instance to piano music in that style, and only later mention other styles or composers, and similarities and differences between them with respect to fingering. If you have not recently performed a Mozart piano sonata, perhaps you might consider the attached score of the third movement (*Allegretto grazioso*) of the sonata in Bb K. 333 as a focus for your deliberations.

Some of the questions we pose will seem somewhat trivial and everyday, while others you may find quite challenging. If you find a question difficult, please give some indication of the nature of the difficulty. In the case of apparently trivial questions, we would be grateful for your attention to relatively minor details, even if you feel that you may be telling us something that we should already know. For example, we are interested to know under what circumstances you consider it normal or acceptable to use the thumb on a black key. Issues such as these may be of relatively little direct musical interest. They could, nevertheless, be of considerable importance for understanding motor-psychological aspects of piano performance.

- 1. Introductory example. What fingering would you use for the opening (bars 1 to 8) of the third movement of the sonata in Bb K. 333? Please explain some of the guiding principles that determine your fingering of this passage.
- 2. Scale-book fingerings. In Great Britain, the Associated Board prescribes fingerings for scales and arpeggios in student examinations. Do you agree with these, or with the prescriptions of the corresponding body in your country? If not, please give examples. In actual pieces, to what extent does your fingering, and the fingering of your students, reflect "official" fingerings of scales and arpeggios?
- 3. Teaching. If you teach (or taught) the piano, do (or did) you prescribe or suggest fingerings to your students? If so, are they the same fingerings that you would use yourself? If not, please specify how your fingerings might differ from those of your students, and explain why, focusing on the Mozart sonatas.
- 4. Black keys. What principles govern the fingering of black keys in your performance practice? Under what circumstances are certain fingers favoured on black keys and certain on white? Please give examples.
- 5. Transposition. Consider the case of thematic material in a Mozart sonata that is exactly transposed to another key and repeated (e.g., K.333, 3rd

movt., mm. 24-29, 148-153). Under what circumstances should the two versions be played with the same fingering? What general principles apply here? Please give examples.

- 6. Prescribed fingerings. To what extent do you follow fingerings prescribed by composers (e.g., Beethoven, Chopin, Prokofiev), or by editors? Please give an example of a composer's fingering that implies a certain kind of interpretation, and discuss the arguments for and against following the composer's fingering in this case.
- 7. Hand distribution. What are your general views on the distribution of notes between the left and right hands? When is it acceptable or even desirable to alter the hand distribution suggested by a classical composer? Please give examples.
- 8. Pedal. In what ways and to what extent does your use of pedal affect the fingering that you use? Please give examples.
- 9. Tempo. How does your fingering depend on tempo? Would you use a different fingering if asked to play the same passage much too fast or much too slow? Please give examples. If you often practise fast passages at a slow tempo, how might the dependency of fingering on tempo affect your practice?
- 10. Sight reading. Does your fingering in sight reading tend to differ systematically from your fingering in rehearsed performance? If so, how? What kinds of fingering tend to promote fluency in sight reading? (Please refer to the Mozart for examples.)
- 11. Rehearsed reading. Suppose that you are giving a polished performance of a solo work by Mozart, and have not had time to memorise. Perhaps it is a studio recording of a solo piece, or a concert performance of a chamber work. Does your fingering in "rehearsed reading" differ in any systematic way from sight reading, or from memorised performance? In rehearsed reading, how important are fingerings of your own that you have marked on the score? Do you always follow your own fingerings? If not, please give an example of how you might change them in performance.
- 12. Memorised performance. Does your fingering for memorised music differ systematically from your fingering in sight reading or performance from the score? Do you use fingering as an aid to memorisation? Does your fingering change as you memorise? Describe typical procedures that you might follow to arrive at the final fingering of a memorised passage. Does your fingering sometimes change at the last minute, or spontaneously in a performance? Under what conditions might such changes affect the technical reliability and expressive content of your performance?
- 13. Personal history. In general, how much does your current fingering practice reflect your initial musical training (teachers, traditions)? How much have you reconsidered or reformulated this acquired knowledge in your professional work? What principal forces (other than initial training) have affected the principles and procedures that you now use to arrive at fingerings?

- 14. Interpretation. How does fingering help you to achieve a given interpretation of a piece? Please consider expressive aspects (dynamics, accentuation, phrasing, articulation), structural aspects (metre, tonality, phrasing, form), and texture (balance of chords and of contrapuntal melodies), giving any examples that come to mind. Do certain fingerings (or indeed individual fingers) have specific expressive or aesthetic effects? Would your fingering of a Mozart sonata change if you were asked to give a particularly "romantic" rendition, or a completely deadpan performance?
- 15. Cognitive vs physiological vs musical aspects. Some fingerings are easy to remember (or even seem to aid memorisation), some fall easily under the fingers, and some facilitate a given interpretation. Which of these three approaches do you favour in your performance? In other words, which aspect plays the most important role in determining your fingerings? Which of the three aspects do you favour in your teaching? Please give examples, beginning with the Mozart sonatas.
- 16. General principles. In the light of the answers you have given above, what are the most important general principles that determine your fingering practice when playing in the style of Mozart?
- 17. Other points. Is there anything that you would like to say about fingering in Mozart, or in general, that has not been covered by previous questions?

• Sobre la digitación: el punto de vista de los pianistas

Siete pianistas profesionales fueron entrevistados para aportar sus diferentes visiones de la digitación pianística. La entrevista incluía comentarios sobre diversas cuestiones técnicas, la influencia de la interpretación y de las indicaciones del compositor en la digitación, los efectos de las diferentes circunstancias interpretativas, y el papel del profesor en determinar estrategias de digitación. Un análisis de las respuestas revelaba cierto sustrato común en cuanto a las actitudes sobre estas materias, aunque acusaba diferencias aparentes. Destacaron cinco temas: 1). Constituyendo el fundamento de las estrategias del intérprete, las digitaciones tipo son mucho más utilizadas para la lectura a primera vista que para el estudio o la memorización de la interpretación. 2). Los intérpretes que se han relacionado desde el principio de su carrera con la música contemporánea, están alejados del uso de digitaciones tipo. 3). Las consideraciones físicas no representan solamente diferencias de digitación, sino que también ofrecen oportunidades de emplear positivamente una digitación agradable que pueda ser altamente idiosincrática. 4). Todos consideran la interpretación como el primer determinante para elegir una digitación, pero las divergencias comienzan al decidir si es necesario solucionar primero las cuestiones musicales para elegir una digitación, o si hay que elegir una

digitación para establecer posteriormente las cualidades de la interpretación. 5). Los participantes parecen tener un profundo conocimiento de la estrategia que llevan a cabo en cada circunstancia. Este último punto confirma los resultados de una investigación anterior sobre la habilidad motora.

• Le dita-parlanti: uno studio intervista sul pensiero dei pianisti in merito alla diteggiatura

Sette pianisti professionisti sono stati intervistati per capire il loro punto di vista circa i diversi aspetti della diteggiatura usata per suonare il pianoforte. La discussione ha incluso considerazioni tecniche, l'influenza dell'interpretazione ed il carattere dato dal compositore nella scelta della diteggiatura, gli effetti delle diverse condizioni di esecuzione ed il ruolo degli insegnanti nel determinare i vari modi di usarla. Analizzando le risposte dei partecipanti si rileva sia una considerevole quantità di idee simili nelle opinioni che essi hanno per questi argomenti, sia alcuni punti di vista notevolmente differenti. Sono emersi cinque punti fondamentali: I) sebbene ci sia una diteggiatura standard alla base delle modalità di esecuzione, i partecipanti affermano che ad un uso diffuso della diteggiatura standard nella lettura a prima vista, si contrappone quella utilizzata in una esecuzione ripetuta più volte o eseguita a memoria; II) gli esecutori con un maggior coinvolgimento o una più precoce pratica nella musica ritengono di avere un approccio meno standard alla diteggiatura; III) le considerazioni di natura fisica non rappresentano solo una limitazione nella diteggiatura, ma offrono anche una buona opportunità per servirsene in modo soddisfacente; IV) sebbene l'interpretazione sia ritenuta universalmente come la determinante principale della scelta delle dita, gli atteggiamenti variano da un rifiuto di prevedere una diteggiatura, finché la diteggiatura non è stata definita in maniera convincente, fino ad un'unica diteggiatura che può mostrarsi quale alternativa interpretativa quando viene applicata; V) i partecipanti dimostrano di avere buone conoscenze riguardo ad un numero considerevole di studi e agli aspetti strategici del loro approccio alla diteggiatura, ed essenzialmente conoscono quali procedure utilizzare in alcuni particolari circostanze, come si può constatare da alcune precedenti ricerche sulle abilità motorie.

• Sur le doigté: le point de vue des pianistes

Nous avons interrogé sept pianistes professionnels sur les divers aspects mis en œuvre dans l'élaboration d'une stratégie de doigté : considérations techniques, influence de l'interprétation et des indications de doigté fournies par le compositeur, lien avec les conditions de l'exécution, et poids de l'enseignement. Si l'analyse des réponses fait apparaître quantité de points communs dans l'attitude face à cette question, elle révèle aussi quelques différences frappantes. Cinq caractéristiques émergent : i) tout en constituant le fondement des stratégies de l'interprète, les doigtés types sont plus largement utilisés dans la lecture à vue que dans la répétition ou la mémorisation de l'interprétation; ii) lorsqu'ils sont très engagés dans la musique contemporaine et qu'ils y ont été exposés tôt, les interprètes s'estiment moins dépendants de ces doigtés types; iii) pour réelles qu'elles soient, les

contraintes physiques de la réalisation d'un doigté autorisent des exploitations positives et agréables pouvant conduire à l'idiosyncrasie; iv) si tous les sujets s'accordent à considérer que le choix du doigté se fonde en premier ressort sur l'interprétation, ils divergent cependant quant à sa mise en œuvre, les uns se refusant à aborder la question du doigté avant d'avoir résolu les questions d'ordre musical, les autres s'efforçant à trouver le doigté qui permette d'établir les choix de l'interprétation; v) les sujets témoignent d'une connaissance déclarative des aspects abstraits et stratégiques de leur approche du doigté, alors que la réalisation de chaque cas concret relève essentiellement de la connaissance procédurale. Ce dernier point confirme les résultats d'une recherche antérieure portant sur l'habileté motrice.

• **Sprechende Finger: Eine Interviewstudie über die Ansichten von Pianisten zum Fingersatz.**

Sieben Pianisten wurden hinsichtlich ihrer Ansichten über verschiedene Aspekte des Fingersatzes beim Klavierspiel befragt. Die Fragen schlossen ein: technische Überlegungen, den Einfluß der Interpretation und von Fingersatzangaben durch Komponisten, die Bedeutung unterschiedlicher Aufführungsumstände sowie die Rolle des Lehrers in der Ausbildung von Fingersatzstrategien. Die Analyse der Antworten erbrachte sowohl beträchtliche Übereinstimmungen in den Einstellungen zu diesem Thema als auch einige auffallende Unterschiede. Es ergaben sich fünf Grundaussagen: 1) Während Standardtechniken die Basis für die Fingersatzstrategien bilden, wird ihre Bedeutung beim Blattspiel höher eingeschätzt als beim Vortrag eingeübter Musikstücke oder beim Auswendigspielen. 2) Für Pianisten, die viel mit zeitgenössischer Musik zu tun haben, hat eine Standardeinstellung zum Fingersatz eine geringere Bedeutung. 3) Aus physischen Überlegungen ergeben sich für den Fingersatz nicht nur bestimmte Zwänge, sondern es eröffnen sich auch Möglichkeiten der Verwendung deutlich angenehmer Fingersätze, die sehr eigenwillig sein können. 4) Während die Interpretation allgemein als die primäre Determinante des Fingersatzes betrachtet wird, reichen die Einstellungen von einer Zurückweisung von Überlegungen über den Fingersatz vor der Lösung musikalischer Fragen bis zur Auffassung, daß ein einziger bester Fingersatz gefunden werden kann, auf welcher Basis dann interpretative Wahlmöglichkeiten angesetzt werden können. 5) Die Teilnehmer zeigen — wie das auch in früheren Untersuchungen zur Motorik gefunden werden konnte — sowohl ihre Befähigung zur Erklärung mehr abstrakter und strategischer Aspekte ihrer Einstellung zu Fragen des Fingersatzes als auch eine grundlegende prozedurale Kenntnis dessen, was sie unter bestimmten Umständen tun.