

# Using music to accelerate language learning: an experimental study

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## Introduction

Even before the flurry of interest in studies investigating the ‘Mozart Effect’ (Rauscher *et al.*, 1993 & 1995), a significant amount research in arts education has focused on the possibility that music, and the study of music, can positively influence children’s overall academic achievement. In the last decade or so, academics have analysed and augmented the body of literature on this subject, and journalists have reported these findings, often less than accurately, to an eager public. The notion that engagement with music is ‘improving’, even magically so, has entered the popular consciousness, and claims such as ‘Music lessons help children climb the intelligence scale’ (Miller, 2004) abound amongst newspaper headlines. To some observers of this phenomenon, the proposition that music has practical uses outside its own curriculum is highly appealing (Cutietta, 1995). To others, the mere construction of extrinsic arguments in favour of teaching arts subjects represents an admission of defeat, and perhaps even a contributory factor in the marginalisation of these art forms themselves (Gingell, 2000).

The truth, of course, is that despite the growing mass of research evidence in the field, many of the questions concerning the relationship between music and general academic progress are still hotly debated. This empirical study attempts to address one of these questions: it asks whether music, employed as a teaching tool in the modern foreign languages (MFL) classroom, can help to accelerate pupils’ language learning. Specifically, it sets out to test the hypothesis that learning words and phrases through the medium of song will improve teenage pupils’ ability to memorise and understand key vocabulary items in French.

## Background

This review of literature cannot and does not seek to provide an authoritative anatomy of language learning. Instead, the focus here is directed towards texts occupying the penumbra between music and language, most of which concern the shared activities of ‘listening, speaking, reading and writing’ (Pachler *et al.*, 2001, 102–125).

Amongst the many articles investigating the link between music learning and language learning, a good number have focussed on speech development, especially in subjects whose speech is non-existent or severely delayed. Despite several early inconclusive studies into the therapeutic value of music education, including an investigation into language development amongst the hearing-impaired by Seybold (1971) and a longitudinal study by Hoskins (1988), more recent investigations by Seeman (2008) and Lowe (1998) into pronunciation have concluded tentatively that music can be a useful aid to language development in this specific area.

Stronger findings are presented over recent decades by studies that looked at reading skills and their relationship with music. In particular, Hurwitz's (1975) implementation of a programme of musical activities based on Zoltán Kodály's theories of musical training resulted in an impressive finding: children in the experimental group, who had been taught clapping activities, pitch notation, rhythmic notation, games and singing, became better readers than the children in the control group, who had received extra lessons in reading.

Hurwitz's positive finding, which was particularly influential in providing the theoretical foundation for the current research project, was successfully replicated by Kelley (1981) in a larger study that combined Kodály instruction with musical activities inspired by the work of Carl Orff. Meanwhile, an investigation by Wood (1990), which studied a cohort of more than seven thousand students at a large American university, brought forth a startling result: undergraduate students majoring in Music, Wood found, scored significantly higher in a standardised reading test than students in any other subject area. Since this was a descriptive study it made no attempt at proving causality between these factors; nevertheless, Wood offered the tantalising suggestion that a causal relationship was, indeed, somewhere at work. Further studies by Andrews (1997), Butzlaff (2000) and Register (2001) add weight to this suggestion.

Finally, the relationship between musical training and listening skills has been the subject of numerous studies. A descriptive study by Fish (1984), which looked at English-speaking students of German, found a statistically significant link between the subjects' ability to discern pitch—an ability nurtured by musical instruction—and their ability to distinguish German phonemes. Karimer (1984) continued this line of investigation with an experimental study based on the same hypothesis. She found that a musical intervention based on rhyming songs helped non-native learners of English to distinguish between English phonemes more effectively than their conventional form of instruction.

### **Context, objectives and rationale**

The setting for this empirical study was a large comprehensive school in southern England. The experiment's aim was to discover whether using music as a teaching tool could accelerate pupils' learning of French voca-

bulary associated with the *passé composé*. It was the principal hypothesis of the study that learning these key words in the context of a newly composed song, rather than through conventional methods, would help pupils to internalise and understand them more quickly. The rationale upon which the investigator's hypothesis was established was tripartite. First, it seemed likely that by associating a 'catchy' melody with the vocabulary, the latter would be made more memorable. Second, it seemed logical that repetition of the song, both in rehearsal and performance, would help pupils to remember the important words. Third, it was hoped that pupils would enjoy the musical element of the activity and therefore become more receptive to learning.

In addition to its primary scholarly objective, the project aimed to increase pupils' access to music by introducing singing activities into the curriculum of another department in the school. Cross-curricular work of this sort was viewed as an excellent means of raising the profile of music amongst staff and students, and, it was hoped, of encouraging pupils to value singing as a worthwhile, everyday activity.

## Methods

The initial proposal was to invite pupils to participate in the study, accepting volunteers into the experimental or control groups on a random basis. However, timetabling issues prevented this being possible, and it was established early in the planning of the study that the experiment would take place in lesson time as part of the normal school curriculum. This allowed more flexibility in terms of sampling, as it was possible to divide classes and organise groups of subjects according to the experimental aims rather than according to friendship groups, lunchtime availability and other complicating factors.

Each year group at KS3 was divided into eight French classes. Of these, two Year 8 classes were selected to take part in the study. These twelve and thirteen year olds had already been assessed and 'set' by the MFL department at the end of Year 7. Now in their second year of instruction in French, they had all been placed in Set 2, meaning that the students' performance in the end of Year 7 examination had been above average, but that their scores were not good enough to merit placement in Set 1. Between the two classes there were 62 pupils. The division of the students into experimental and control groups (henceforth 'Music' and 'Non-Music' groups) was achieved randomly using a computer spreadsheet. Each group originally comprised 31 pupils, but some pupil absences inevitably occurred and for the purposes of this study's analysis, the Music group had 27 subjects whilst the Non-Music group had 29. These were the numbers reached after eliminating from the analysis any subject who had missed any part of the experiment.

The tool used to test the achievement of the subjects was developed by the investigator in consultation with the MFL department: it was used before the

interventions started, as a pre-test, and afterwards, as post-test. The pupils' task was to read the nineteen English phrases and write the French equivalent in the right column. The phrases were mostly in the *passé composé* but some imperfect past tense phrases were included alongside a few nouns, such as days of the week, that were generally useful for discussions about things that happened in the past. All pupils had studied this topic, and so had a general familiarity with the concepts, if not the words, they were required to translate. Fifteen minutes were given to complete the test, after which time the papers were collected and marked.

Three marks were given when an answer was perfectly correct. Two marks were given when the answer conveyed the correct meaning, but included a minor error. One mark was given to answers that included some correct information, but were marred by a serious error. A mark of zero was awarded to answers that did not convey the correct meaning at all. In order to reduce the impact of the subjectivity inherent in this three-point system, all tests were marked twice, and, where discrepancies occurred, markers came to agreement after discussion. The marking was carried out by two experienced French teachers neither of whom were otherwise part of the study. They were not privy to information about which papers came from the Music and Non-Music groups.

Although the subjects were pre- and post-tested in their original classes, they were split into their experimental groups for the duration of the interventions. The same teacher taught each group twice, at different times during the week, allowing approximately the same time between each session and between the final session and the post-test. The interventions themselves were strictly timed, to allow a total of one hour's tuition to each group.

The Non-Music group studied the phrases and words that they were required to learn according to the usual policy of the MFL department. This meant studying a short poem in French containing all the important words and phrases. *Le weekend dernier* described the activities of a teenager over the course of a weekend. It related events such as having breakfast, going on a picnic, playing with friends and family, and so on. The poem consisted of an introductory stanza followed by various verses each describing one key event in the passage of the weekend.

The Non-Music group studied this text through a range of conventional methodologies. The teacher read the poem aloud, carefully and slowly, allowing time for pupils to ask questions. Pupils were encouraged to write down definitions of words and phrases that were new to them on a copy of the poem that they were allowed to keep and take home. The poem was then read again, this time by volunteer pupils, the teacher correcting pronunciation as necessary. Other non-musical activities followed, including question and answer sessions using words from the poem and memory games involving its key phrases and concepts.

Meanwhile, the Music group received as the basis of their intervention a similar introduction to the poem's words and phrases. The teacher read the

poem, again allowing pupils sufficient time to ask questions about the new vocabulary. However, rather than developing their familiarity with the words through questioning and word games, the teacher reinforced the Music group's knowledge of the key phrases by rehearsing and performing a musical version of *Le weekend dernier*. This was a short piece of music, newly composed by the investigator, to which the words of the poem had been set. Over the course of the hour spent on the activity, this short song was learned thoroughly by the Music group.

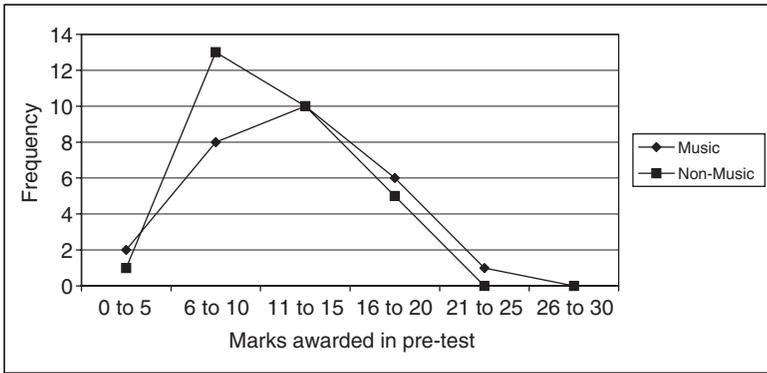
The most important consideration when composing the song had been the ease with which it could be learned. It was clear from the start that it would have to be simple, but it was also imperative that the melody was 'catchy' and appealing to its target audience. The style eventually selected as most suitable—a uncomplicated Blues style employing primary chords in compound quadruple time—was thought to be one most pupils could enjoy. Its stylistic language was sufficiently far from mainstream popular music to avoid being seen as a clumsy parody, but neither was it recognisable as 'high' music which pupils might have found inaccessible.

By default the music was diatonic, and, after careful consideration, a modest range in the key of D minor was established over which most Year 8 pupils would feel confident. A verse and chorus structure was developed, using the words of the poem's introductory stanza as the chorus. The music to this chorus section, which would start the song, was deliberately simple, using almost exclusively conjunct movement. Its rhythm, based on a swung crotchet-quaver pattern in compound time, attempted to replicate the iambic metre of speech. Adherence to speech patterns was even stricter in the verses, where simple chords punctuated an almost recitative-like setting of the text.

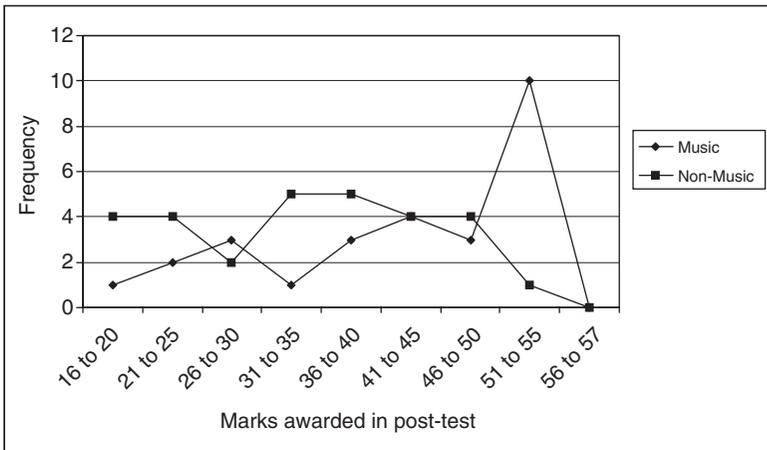
## Results

An initial examination of the data looked positive. The mean scores in the pre-test put the Music group, at 12.04, a little ahead of the Non-Music group, at 11.83; however, this small advantage to the experimental group did not look significant. The randomisation of the subject placement, therefore, seemed at first glance to have been successful. Nor did anything noteworthy arise in the mode averages of these data: although the Non-Music mode was 10 whilst the Music group displayed modes of 9, 12 and 16, the relatively small number of replicates on each side made this statistic to a large extent meaningless. The range of the data at this stage was predictably wide, with subjects in each group scoring as little as 3 (both groups) and as much as 24 (Music). Figure 1 summarises this information.

Straightforward examination of the post-test data (see Figure 2) also looked promising. The means here had become considerably diverged, with the Music group, at 42.15, well ahead of the Non-Music group, at 34.59. The highest score was 54 (found in both groups), whilst the lowest (found in the Non-Music group) was 18. The average percentage increase shown



**Figure 1** Graph showing distribution of pre-test scores



**Figure 2** Graph showing distribution of post-test scores

by subjects in the Non-Music group was 39.9%, whereas pupils in the Music group appeared to have increased their marks by 52.8%.

Although the data ranges demonstrated by the groups' post-tests were not hugely different—36 and 34 marks respectively—the scores of the Music group did appear to be more 'bunched' than those of the Non-Music group. This seemed to support Karimer's (1984) finding that musical intervention through song allowed pupils to progress at a more uniform rate.

Applying a conventional *t*-test, considering a statistical significance of  $p = 0.05$ , produced the results shown in Table 1. The observed *t*-value was 0.18, lower than the 2.00 required to demonstrate a significant difference between the groups. This analysis corroborated the initial observations made of the raw data and verified the process used to create successful randomisa-

**Table 1** *t*-test analysis of the pre-test data

	<i>Music</i>	<i>Non-Music</i>
Mean	12.04	11.83
Variance	24.04	13.79
Observations	27	29
Pooled Variance	18.72	
df	54	
<i>t</i> Stat	0.18	
P(T <= <i>t</i> ) two tail	0.86	
<i>t</i> Critical two tail	2.00	

**Table 2** *t*-test analysis of the post-test data

	<i>Music</i>	<i>Non-Music</i>
Mean	42.15	34.59
Variance	121.28	122.39
Observations	27	29
Pooled Variance	121.86	
df	54	
<i>t</i> Stat	2.56	
P(T <= <i>t</i> ) two tail	0.01	
<i>t</i> Critical two tail	2.00	

tion in the experimental groups. The results of the pre-test, therefore, were that they were not statistically different.

Table 2 shows the results of the *t*-test performed on the post-test data. As discussed, the mean scores are noticeably divergent, whilst the respective levels of variance, though high, have remained close. The critical benchmark for the *t*-value has, of course, stayed the same, since this is derived from the number of replicates analysed.

The output of the analysis, *t*, is here observed at 2.56, clearly exceeding the benchmark figure, 2.00, by a comfortable margin. According to the current statistical analysis, therefore, the Music group achieved significantly higher marks than the Non-Music group in their post-tests. Indeed, lowering the alpha to  $p = 0.01$ —a much more demanding level of significance—still produces a significant result, lending the result a yet higher degree of confidence.

The positive result of the second *t*-test suggests that, in this context, the musical intervention was significantly more effective than the control intervention as a teaching tool. It appears that the pupils in the Music group learned the past tense words and phrases of *Le weekend dernier* more securely than their peers in the Non-Music group; this in turn enabled them to translate the English phrases in French with greater success. Whilst this

finding provides an answer to the principal question of this research, the precise nature of the causality, and the extent to which the result can be generalised, however, are further questions for investigation.

### **Evaluation**

The instrument used to measure the pupils' language ability was not a standardised test. It cannot be said with confidence, therefore, that its reliability is quantifiable. Compared with more formal research instruments, the number of questions it asks is rather few; a greater number of questions would certainly have increased the reliability of the test. Given the nature and context of the research, however, a test involving many questions, taking perhaps forty or fifty minutes to complete, was not a practical option. Nevertheless, research seeking to replicate the present finding would benefit from using a standardised instrument.

The validity of the data, however, is easier to ascertain. The instrument was designed to discover pupils' ability to memorise, for a matter of days, and translate certain words and phrases associated with the *passé composé* and imperfect past tense in test conditions, and those aims, though limited, it achieved. As in the title of the present study, this long-winded explanation is sometimes shortened, for convenience, to 'language learning'. But in order to be accurate, it is precisely this long-winded explanation that must be employed. 'Language ability' and 'MFL skills' are terms that this study does not seek to define; moreover, they are much wider concepts than it seeks to encapsulate. More ambitious studies, carried out over a longer timescale, may address these questions.

It is also worth considering confounding factors that may possibly have contributed to the positive effect observed. The fact that a control group was included eliminates the possibility that the teacher's time and attention *per se* confounded the results. However, we cannot exclude the possibility that the teacher who delivered the lessons, hoping to achieve a positive result and spurred on by the novelty of the exercise, was more enthusiastic when working with the Music group. Although this factor cannot be eliminated from the present study, future investigations might attempt to remove the possibility of this 'novelty' factor by employing longitudinal research techniques.

### **Discussion**

Before any discussion of this study's conclusions, it is worth revisiting the philosophical context in which the research is located. A paper such as this, setting out 'scientifically' to test a hypothesised relationship between two factors may parade its unashamedly positivist approach without fear of prejudice whilst its thesis remains theoretical. When theory spills over into practice, however, where science informs policy, and when the scientist begins to make recommendations for real-life practitioners, the language of

positivism alone becomes inadequate. Simple observations must now meet with ethical analysis. In other words, it is not enough simply to ask whether one thing affects another; we must also ask ourselves why the posited relationship is important, and how finding it may impinge upon educational practice, immediately and in the long term.

The *raison-d'être* for many studies investigating the influence arts subjects may have on general academic performance is to establish a relationship that will justify arts education. 'More often than we would like,' writes Eisner (1998, p. 7), 'arts educators receive requests to justify our professional existence or the existence of the arts in our schools on the basis of their contributions to non-art outcomes.' Ostensibly, there is nothing inherently wrong with this: if arts education can be useful in other subject areas, why not say so, and loudly? However, as Eisner continues:

I sometimes ask myself if those who inquire ever considered reversing the question. Have they ever thought about asking how reading and math courses contribute to higher performance in the arts? (p. 7)

Eisner's rhetorical question reveals some uncomfortable truths about the general perception of subject hierarchy. Whether we like it or not, arts are so frequently cast in a supporting role because they are perceived as less important than the 'hard' academic disciplines like English and mathematics.

Gingell (2000, p. 78) addresses this extrinsic justification of the arts. 'Art, like other things,' Gingell writes, 'may either constitute or contribute to a worthwhile human life. As it is one of the ends of life, and not simply a means to other ends, it cannot be justified.' Fleming *et al.* (2004, p. 180) continue this discussion by arguing, 'to mount extrinsic arguments in favour of teaching arts may be to miss their real power and may account for why some art forms are marginalised'.

Whilst acknowledging Gingell's objections, this study takes a robust approach to the ethical issue of whether to justify the arts extrinsically. In part, this approach is straightforward *realpolitik*. According to the education policy of governments around the world, the measurable effect a thing may have on children's ability to read text and compute numbers is increasingly the sole mediator of the value of that thing's place in the curriculum. Arts educators may quite rightly hold loftier views on the extrinsic value of the arts but they cannot currently rely on these being shared by those who forge policy.

In essence, this means that in order to secure a place for the arts, those who would fight its cause are obliged to focus on ends rather than means. Championing the effect the arts may have on so-called 'academic' disciplines is one way this might be achieved; but there is seemingly no limit to the creativity of those who promote the arts in these roundabout ways.

This is not to say that artistic ends justify any means. Tawdry publicity of bad science is an abhorrent phenomenon. But if music education can be bolstered by bringing attention to a peripheral but nonetheless genuine

characteristic of that art form, then so much the better. Gingell's warning, in other words, does not go unheeded; but, in the current climate, it is a reality that in certain contexts the failure to promote the extrinsic benefits of the arts may result in their extinction.

In truth, though, the principal motivation for this paper was philosophical rather than practical. The current experiment was designed to satisfy a desire to find out the truth behind a much-vaunted relationship, and, as Fleming puts it 'to know whether particular practices in school have an impact elsewhere' (2004, p. 7). This is the spirit, therefore, in which this conclusion is written.

Before the study's conclusions can be summarised, however, the inevitable host of caveats must be considered. The experiment was controlled and carefully planned but, as the detailed analysis of the study's methodology revealed, the groups were rather small when compared with those used by some other studies. Similarly, the duration of the experiment was relatively short, giving no perspective on the longer-term effects of music instruction on language skills. The specificity of the experiment, both in terms of its methodology and measured outcomes, also limits the relevance of its conclusions.

Whilst these factors should not be disregarded, they should not distract from the exciting fact that the study's result was positive. The experiment was able to show that by using music as a teaching tool, MFL skills were raised amongst a population of subjects. Many questions remain, but interim implications for practice and future research can be drawn. The following points can be made in conclusion:

According to the results of the experiment described here, integrating musical, and specifically singing, activities into MFL lessons appears to be an effective means of raising pupil achievement. To reformulate the syntax of the original research question, it seems likely that learning words and phrases through the medium of song can indeed improve teenage pupils' ability to memorise and understand key vocabulary items in French.

MFL teachers in secondary schools should, therefore, consider the use of songs in order to teach key vocabulary in French. Although little can be said about the longer-term effects of musical activities in the MFL classroom, in the short term, the effect seems promising. Furthermore, there appears to be no logical reason why this effect should not extend into the medium or long term. Nor does there appear to be any reason why the same technique should not be applied in other modern foreign languages, or perhaps even to other curriculum areas where the learning of vocabulary is required.

Lastly, if the relationship between music and language learning is to be fully investigated, hysterical journalism and dubious pseudo-science must give way to measured and methodical research in this field. Future studies should investigate the long-term effects of using music in the MFL context. Larger samples, too, should be employed. Descriptive studies, of the kind

undertaken by Wood (1990), might enrich the debate by identifying links between the study of music and MFL ability at tertiary level.

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