The Social and Applied Psychology of Music

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provided less data-driven discussions of the relationship between illegal drug usage and artistic creativity (see e.g. Groce, 1991; Jenny, 1998; Lenson, 1998; Markert, 2001; and Sherrer, 1971).

This absence of a clear conclusion concerning the effect of drugs on creativity is almost certainly attributable (at least in part) to different drugs having different effects on different types of people using them in different contexts (see e.g. Krippner, 1985). Furthermore, although the use of a variety of illegal drugs may or may not *enhance* creativity, the existing literature provides no information concerning a subtly different issue, namely *how* drug usage might affect the products of creative activity. Similarly, very few quantitative studies have considered creative products that were generated outside the laboratory, such that the existing research on drugs and creativity is lacking in ecological validity. This dearth of information persists (see Greeson, 1986) despite the public's obvious fascination with the effects of drugs on several well-known pop musicians such as Brian Jones (from The Rolling Stones), Jimi Hendrix, John Lennon, Janis Joplin, Jim Morrison (from The Doors), Sid Vicious (from The Sex Pistols), John Bonham (from Led Zeppelin), and Hillel Slovak (from The Red Hot Chilli Peppers). In an initial attempt to address this, an unpublished study by North and Beauvois obtained complete sets of lyrics and dates of drug usage for five well-known pop groups/artists (namely Aerosmith, The Rolling Stones, The Incredible String Band, The Beatles, and Todd Rundgren). Computer analysis of the lyrics indicated that measures of lyrical aggression increased after periods of drug usage, whereas levels of ambivalence, cognitive terms, and cooperation decreased after such periods. Clearly more data is needed to identify whether these findings would be replicated among a much larger sample of lyrics.

2.3.4 The 'Mozart effect'

In recent years, some researchers have begun to argue that both playing and listening to music bring with them additional benefits in terms of intelligence. The story begins in 1993 with the publication of Rauscher, Shaw, and Ky's 'Music and spatial task performance' in the journal *Nature*. This reported findings from a study in which undergraduates spent 10 minutes listening to Mozart's sonata K.448, relaxation instructions, or nothing at all before then completing paper folding and cutting tasks taken from the Stanford-Binet Intelligence Scale. The latter involve drawings of a piece of paper being folded several times before having various shapes cut into it. Respondents are then asked to say what the folded and cut paper would look like when unfolded. They do this by selecting one of several pictures presented in a 'multiple choice' format. Rauscher and colleagues found that participants did better on the paper folding and cutting task after they heard Mozart than after they heard the relaxation instructions or nothing at all, such that their IQ scores were 8 to 9 points higher. The 'Mozart effect' was born. Other related studies have focused on playing rather than listening to music, showing a positive impact of music lessons on spatial reasoning skills in pre-schoolers (e.g. Rauscher, Shaw, Levine, Wright, Dennis, and Newcomb, 1997), and even that rats exposed to Mozart's music demonstrated better maze navigation skills, supporting the notion that 'musical experience may improve skills in ... spatial domains' (Rauscher, Robinson, and Jens, 1998, p. 427).

Rauscher (1999, p. 827) herself has stated quite explicitly that the most common misconception of her work is that exposure to 'Mozart enhances intelligence [in general]. We made no such claim. The effect is limited to spatial-temporal tasks involving mental imagery and temporal ordering'. Nonetheless, recent years have witnessed the development of a fervent belief among the general public that exposing young children to any form of classical music will boost intelligence and other cognitive abilities. For example, the BBC News website reported on 19th May 2005 that 'many US hospitals give classical CDs to new mums. In the UK, many parents have also embraced the theory, with Classic FM's *Music for Babies* CD enjoying several weeks at the top of the classical charts earlier this year. And this week *Sound Beginnings*, a series of concerts aimed at the very young, begins in Hampshire.'

Similarly, Bangerter and Heath (2004, pp. 609–610) describe how, in 1998, the state of Georgia in the USA passed a bill to distribute free classical music CDs to new mothers: 'In an interview, the governor of Georgia and initiator of the bill said: "As you know, the brain has two lobes. The studies show that music engages both hemispheres of the brain—its creativity and emotion engage the right lobe, while rhythm and pitch engage the left. So people who receive musical exposure at a young age develop a bundle of nerves that connects those two halves"' (*Baltimore Sun*, July 6, 1998). Several other US states have acted similarly. The state of Florida passed a bill requiring state-funded day-care centers to play classical music every day (State of Florida Senate Bill 660, May 21, 1998). Books (Campbell, 1997, 2000), toys and CD collections have been marketed claiming beneficial effects of classical music. And in surveys we have conducted in California and Arizona (total $N = 496$), over 80% of respondents report some familiarity with the ME [Mozart effect]. The ME has diffused abroad, and appears in dozens of countries around the world. In 1996, the BBC's [Tomorrow's World] Megalab series tested over 8,000 students for an improvement in spatial intelligence after listening to either Mozart or rock music. In its spread, the ME has adapted to local frames of reference: an Indian newspaper describes the ME as 'music curry for the soul' (*Times of India*, March 2, 2001). Other manifestations seem comical: playing Mozart to prison inmates (*Houston Chronicle*, May 2, 1999) or even to roses during their germination (*Korea Herald*, May 22, 1999).'

Nor have academics or educational practitioners been immune to the excitement. The potential Mozart effect has been used by many to justify the inclusion of music in the school curriculum. The argument here is something like, 'Music should be taught at school because it aids maths skills.' Whether the best way to boost school maths performance is to run more music classes or more maths classes is a separate issue, but this again raises the question of whether involvement in music in general and Mozart's in particular does bring with it other benefits. Indeed, we have highlighted the lay interest in the Mozart effect simply because this stands in stark contrast to the highly controversial nature of its scientific status. While it is entirely understandable that parents, educators, and politicians want to do everything possible to help young people get a good start in life, it is almost certainly safe to say that the amount of money currently being spent far outweighs the amount of unequivocal supporting evidence.

The original research by Rauscher and colleagues led to numerous follow-up studies shortly afterwards, and Chabris (1999) carried out a meta-analysis of 16 of these to determine whether the Mozart effect really does exist. Meta-analysis provides a statistical measure of the effect size (i.e. the magnitude of the impact) of the music in question, such that the larger the effect size so the more effective was the music. Chabris concluded that the results showed an average cognitive enhancement attributable to the Mozart effect of just 0.09 standard deviations, or only 1.4 IQ points. Different studies used different measures of the effects of music, but even when considering only studies of specifically spatial-temporal skills (such as the paper folding and cutting task) the Mozart effect was worth an improvement of only .14 standard deviations or 2.1 IQ points. 'Accordingly, exposure to ten minutes of Mozart's music does not seem to enhance general intelligence or reasoning, although it may exert a small improving effect on the ability to transform visual images. However, this enhancement is essentially restricted to a single task, is one-quarter as large as that originally reported for a broader class of cognitive abilities, is not statistically significant ... and is smaller than the average variation of a single person's IQ-test performance' (Chabris, 1999, p. 826). To borrow from the title of his paper, Chabris' findings were interpreted by many as sounding a requiem for the Mozart effect, and Schellenberg's (2006) review of the evidence shows that a similar degree of scepticism persisted in the years immediately following Chabris' meta-analysis.

Rauscher (1999) contested whether Chabris should have included all the studies that he did in the meta-analysis, on the grounds that they did not test the benefits of Mozart's music claimed by her original work (concerning mental imagery and temporal ordering rather than intelligence *per se*). Whether you agree with Rauscher's criticism depends of course on whether you accept Rauscher's or Chabris' definition of which studies really do concern 'the Mozart effect': in other words, a crucial factor may be the definition of what constitutes the kind of benefits that might be expected as a result of exposure to music. For example, Hetland (2000a) published another, less well-known meta-analysis on music listening, included over 30 studies that she adjudged to concern the Mozart effect (including more emphasis than Chabris on studies concerning playing rather than listening to music), and reached much more positive conclusions concerning spatial-temporal abilities. Furthermore, we suspect that Rauscher would not be troubled too greatly by Chabris' findings that any Mozart effects that might exist are only small in magnitude: although Rauscher would expect to find *statistically significant* Mozart effects under the precise conditions she describes in her research, to the best of our knowledge she has never argued that these effects should be *massive*. Rauscher (1999) herself makes a second objection to Chabris' conclusions, noting that 'Because some people cannot get bread to rise does not negate the existence of a "yeast effect"' (p. 828). In other words, a small number of failures to replicate her findings do not mean necessarily that the Mozart effect does not exist. But to elaborate further on Rauscher's metaphor, a failure to get bread to rise usually implies that the cook doesn't understand how yeast works. We suspect that another explanation for the inconsistency in findings concerning the Mozart effect arises simply from confusion over the precise cause. If researchers do not know which aspects of the music should be effective or which variables they should impact upon then it would be expected that they would sometimes fail to obtain a Mozart effect.

There is no clear consensus yet concerning how any effect may actually come about. Rauscher and colleagues, for example, argued that passive listening to complex music such as Mozart should enhance abstract reasoning in general, including performance on spatio-temporal tasks such as the paper folding and cutting task. Other studies have suggested that the effect may occur when people enjoy the music they hear. For example, Nantais and Schellenberg (1999) found that listening to Mozart or a passage from a Stephen King story enhanced performance on paper folding and cutting providing people enjoyed what they heard; and Schellenberg and Hallam (2005) found that school pupils performed better in response to music by pop group Blur than to Mozart's. Note also, however, that this 'enjoyment explanation' finds it difficult to explain why Rauscher, Robinson, and Jens (1998) should have found that Mozart could improve the ability of rats to learn a maze, an experience they presumably could not have found enjoyable no matter what music was played. Alternatively, Thompson, Schellenberg, and Husain (2001) and Husain, Thompson, and Schellenberg (2002) argue that any effect is caused by music (or any other stimulus for that matter) increasing arousal and improving mood.

Furthermore, as Schellenberg (2001, 2003, 2006) and Rauscher and Hinton (2006) argued, it seems reasonable to suspect that the processes by which music *listening* purportedly improves cognitive performance may be different to those by which *playing* a musical instrument purportedly improves cognitive performance. For example, Chan, Ho, and Cheung (1998) and Ho, Cheung, and Chan (2003) have proposed that music lessons may have linguistic benefits, perhaps because they improve auditory temporal processing. Other studies have identified correlations between taking music lessons and mathematical abilities (Vaughn, 2000), reading abilities (e.g. Butzlaff, 2000), and spatial-temporal abilities (e.g. Hetland, 2000b). Experimental evidence from recent years suggests that the music lessons may have been *causing* the improvements in other abilities, since experimental assignment of children to the former led to gains in other domains (see e.g. Costa-Giomi, 1999; Gardiner, Fox, Knowles, and Jeffrey, 1996; Gromko and Poorman, 1988; Rauscher and Zupan, 2000; Schellenberg, 2004). Schellenberg (2006) proposes four possible explanations of the positive effects of music lessons on other intellectual abilities. First is that the effect could be 'an extension of the well-known fact that schooling raises IQ' (p. 130). Second, the 'other' benefits of music lessons may arise from one or more of the range of generic skills that these lessons would be expected to improve (e.g. fine motor skills, memory, reading). A third possible explanation is that the abstract nature of music primes abstract reasoning skills in general. Finally, learning to play music may be similar to learning a second language, and the latter 'is known to confer some non-linguistic cognitive advantages' (p. 130). For the time being, the simple truth is that we just don't know for sure how any 'Mozart effect' operates, whether any effects are stronger as a result of listening to or playing music, and what specific nature the effect might take. However, as understanding grows we might expect to find more positive evidence, such that future meta-analyses may reach more positive conclusions than that of Chabris (1999).

3

Musical preference and taste

Wagner's music is better than it sounds
Mark Twain

It goes without saying that musical preferences vary massively. If you and your friends were each to nominate your favourite piece of music it is virtually certain that you would nominate very different pieces. If you were then asked to say why you liked each piece so much then the reasons would probably be even more diverse in both their nature and their degree of sophistication. Some people, for instance, would state that their favourite music evokes certain emotions, others would attribute their preference to memories they have associated with the music, and others would say that they 'simply like it'. All this diversity, of course, poses a considerable challenge to music psychology. How could such a varied set of responses be explained? In Chapter 2 we saw the different means by which researchers have explained composers' eminence and 'greatness', but in contrast this chapter describes some of the ways in which psychologists have attempted to explain people's more mundane, everyday musical likes and dislikes. The chapter organizes the influences on musical taste into factors relating to the music, the listening situation, and the listener. After describing these influences, we provide a reciprocal response model of musical preference, discuss emotional responses to music, and finally consider research that has directly investigated people's musical likes and dislikes as they go about their daily lives.

3.1 The music

Research on how aspects of the music itself influences preference has been dominated by experimental aesthetics. We begin by describing the basic approach adopted by experimental aesthetics before then considering two of the main theories. The first was proposed by Daniel Berlyne, and concerns the effect of music (and other artistic objects) on physiological arousal. The second theory, the preference for prototypes model, focuses instead on cognitive factors.