Responses to Music in the Real World

Adrian C. North

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Contents

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This thesis is dedicated to my parents for their love, support, and understanding.

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Abstract

This thesis concerns aesthetic responses to music, and is divided into four main parts, with each comprising an initial literature review and subsequent empirical studies. Part A describes 5 studies which employed conventional laboratory techniques to investigate how theories of aesthetic response might be extended to explanations of emotional responses to music and liking for musical styles. This part of the thesis also discusses how these theories might be reconciled. In contrast, Parts B-D of the thesis provide several examples of how responses to music in the real world are not made in the 'social vacuum' of conventional laboratory research, but are instead linked inextricably to the context of musical behaviour. Part B reports 7 studies which investigate the relationship between music and the immediate listening situation. These demonstrate that through variables such as 'appropriateness', musical preference may interact with the environment in which it is experienced. Part B also investigates the relative roles of arousal- and cognitive-based factors in this, and suggests that music is selected to as to optimise responses to the listening situation. Part C investigates two sources of extra-musical information, namely stereotyping and the physical attractiveness of music performers. Although some research has been carried out on conformity and prestige effects on musical preference, the two studies in this part of the thesis indicate that other types of information may also be important social features of people's musical behaviour. Finally, Part D reports three studies concerning artistic eminence and acculturational factors. These demonstrate a considerable consensus between several means of measuring artistic eminence; that this consensus breaks down to some extent as a result of cultural factors; that archival data sources can reveal several interesting cultural trends in eminence; and that there are age differences in tolerance for musical styles. These three studies indicate that the broader culture in which people develop and live also influences musical behaviour. More generally, the research reported in this thesis suggests that although context-independent laboratory studies can be informative in their own right, responses to music also seem related to their social psychological, real-world context.

Part A. Experimental Aesthetics

Chapter 1. Experimental Aesthetics

This thesis concerns musical preference, and is divided into four main parts. Each of these begins with a literature review, and is followed by several pieces of research based on that literature. Part A concerns three approaches to preference, namely Berlyne's theory, the preference-feedback hypothesis, and the preference for prototypes model. The aim of the present chapter is to introduce and explain these theories. The subsequent research in this part of the thesis draws on the theories, and considers how they might be related to emotional responses to music, liking for musical styles, and also one another.

The remaining sections of the thesis are organised as follows. Part B concerns the relationship between music and the immediate environment in which it is experienced. The research concerning this draws on the theories outlined in the present chapter. In contrast, Parts C and D concern other forms of social and cultural influence on musical preference that are more difficult to explain in terms of existing theories of experimental aesthetics. Part C concerns two aspects of extra-musical information, namely stereotypes and the physical attractiveness of music performers. Part D concerns broader cultural influences on responses to music by considering trends and consensus in eminence, and how tolerance of musical styles might develop across the lifespan.

Berlyne's theory With its publication in 1876, Gustav Fechner's *Vorschule der Asthetik* established experimental aesthetics as the second oldest topic in experimental psychology. Fechner's approach emphasised the basic building blocks of aesthetic preferences such as responses to simple shapes and geometrical forms, and with these he tested ideas such as the 'aesthetic mean', i.e. the idea that beauty was associated with the absence of extremes. This idea can be traced back to the writings of Plato who argued in the *Statesman* that the arts are 'on the watch against excess and deficit ... (in that) the excellence and beauty of every work of art is due to this observance and ... a standard removed from the extremes'. Similarly, Aristotle wrote in the *Nichomachean Ethics* that 'A master of art avoids excess and defect but seeks the intermediate and chooses this'. These ideas perhaps reached their fruition with Daniel Berlyne's psychobiological approach which founded 'the new experimental aesthetics' (Berlyne, 1971, 1972). He characterised research within this approach as possessing one or more of the following features:

'1. It concentrates on collative properties of stimulus patterns. Collative properties (of which more will be said later) are 'structural' or 'formal' properties, such as variations along familiar-novel, simple-complex, expected-surprising, ambiguous-clear, and stable-variable dimensions.

2. It concentrates on motivational questions (see Berlyne, 1960, 1970, 1971).

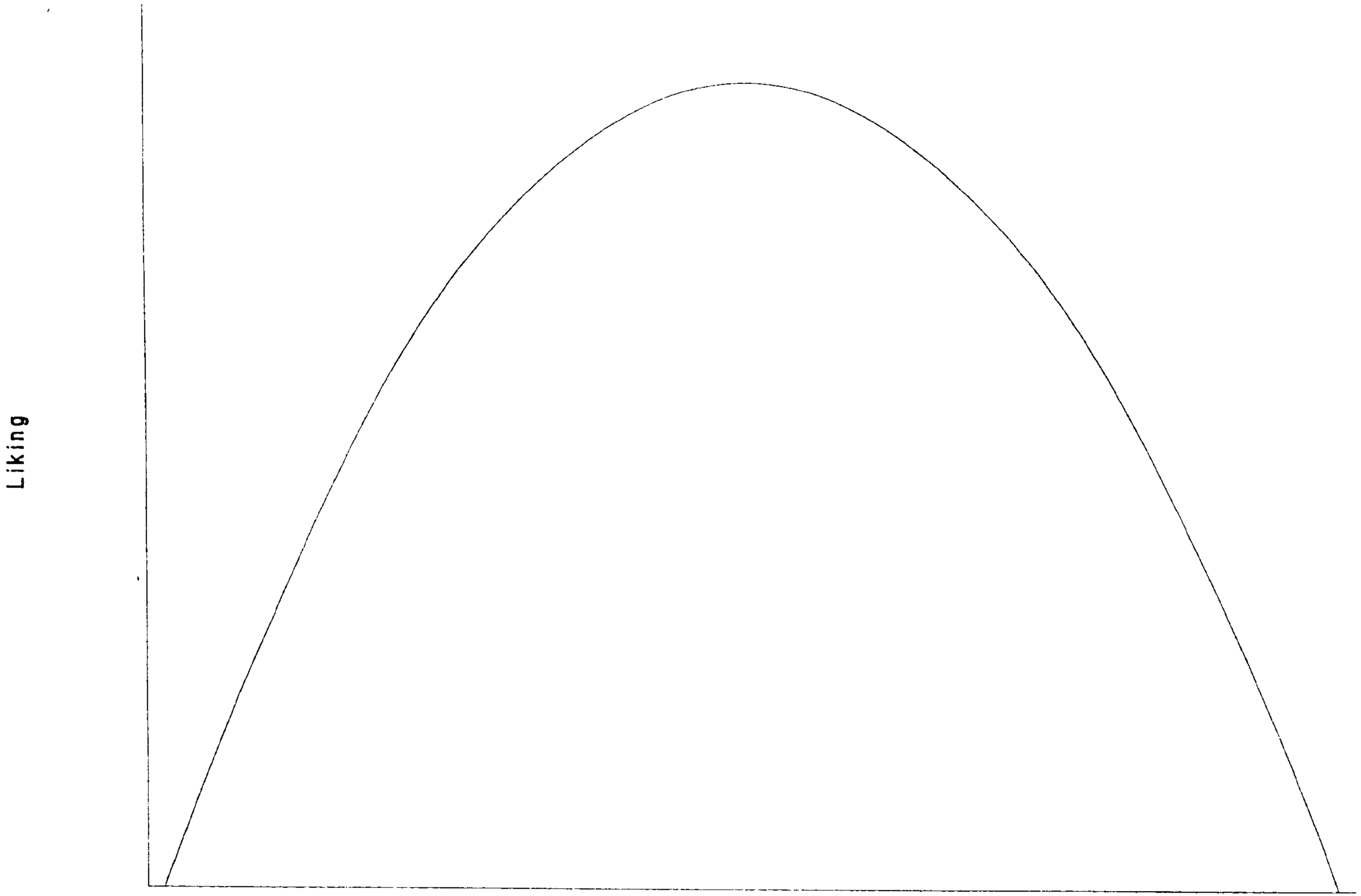
3. It studies nonverbal behavior as well as verbally expressed judgements.

4. It strives to establish links between aesthetic phenomena and other psychological phenomena. This means that it aims not only to throw light on aesthetic phenomena but, through the elucidation of aesthetic problems, to throw light on human psychology in general' (Berlyne, 1974, p. 5).

Through this approach Berlyne (1971) and others working with him in Canada produced a theory that has more or less dominated research in the field, and has had a strong influence on the research reported in this thesis. The theory states that preference for aesthetic stimuli is related to their 'arousal potential' which is the amount of activity they produce in the reticular system of the brain: this can be measured through various non-invasive physiological means such as heart rate and respiration rate, as well as through subjects' verbal reports. Stimuli with an intermediate degree of arousal potential are liked most, and this degree of liking gradually decreases towards the extremes of arousal potential. This means that there is what has been termed an inverted-U relationship between preference and stimulus arousal potential (see Figure 1.1), and this relates to the well-known Wundt curve which states that the organism obtains maximum pleasure from moderate levels of stimulus intensity (Wundt, 1874).

Stimuli of moderate arousal potential are liked most because on their way to the cortex the fibres of the reticular system pass through both pleasure and displeasure centres. The former has a lower threshold level and a lower asymptotic level than the latter, and it is this that determines the nature of the relationship between liking and arousal potential. With low degrees of arousal, only the pleasure centre is activated so that liking increases with arousal. At slightly higher degrees of arousal the displeasure centre also becomes activated so that the relationship between arousal and liking begins to level-off. At high degrees of arousal, the pleasure centre has already reached its asymptotic degree of activation whilst activation in the displeasure centre continues to increase, and this causes liking to decrease.

Figure 1.1 - The Relationship Between Liking for Music and Its Arousal Potential



Berlyne stated that the stimulus variables that mediate arousal fall into three categories; 'psychophysical', which are the intrinsic physical properties of a stimulus such as the brightness of a painting or musical tempo; 'ecological', which are the learned associations between a stimulus and other events or activities of biographical importance; and 'collative' which are the informational properties of a stimulus such as its degree of novelty or complexity. Berlyne (1971) proposed that the collative variables are the 'most significant of all for aesthetics' (p. 69), and they have dominated research with several studies of musical stimuli supporting the proposed inverted-U relationships between liking and laboratory manipulations of both novelty/familiarity and complexity (see reviews Finnas, 1989; Hargreaves, 1986).

For example, Vitz (1966) found an inverted-U relationship between the information content of tone sequences and subjects' ratings of their pleasantness. McMullen (1974) found that subjects preferred melodies of intermediate informational redundancy and an intermediate number of pitches. Similarly, Steck and Machotka (1975) found that an inverted-U relationship held between ratings of liking and complexity assigned to musical stimuli. Similar findings are described by Berlyne (1971; 1974), Heyduk (1975), Walker (1980), and Hargreaves (1984).

The preference-feedback hypothesis The preference-feedback hypothesis (Colman, Sluckin, and Hargreaves, 1981; Sluckin, Hargreaves, and Colman, 1983) is a second approach to preference investigated in this Part of the thesis. It is based on Berlyne's theory, and concerns the relationship between liking and one of the collative variables, namely familiarity. The hypothesis separates stimuli into two classes. Class B stimuli (e.g. surnames), whose degree of familiarity is not under voluntary control, should exhibit an inverted-U relationship between liking and familiarity as a result of the arousal-based process proposed by Berlyne. In contrast, Class A stimuli (e.g. Christian names), whose degree of familiarity is under voluntary control, should at any given moment in time exhibit a positive, monotonic relationship between familiarity and liking. Super-optimal, and consequently disliked levels of familiarity are prevented from occurring by a cultural feedback mechanism: exposure is deliberately avoided once optimal stimulus familiarity has been attained, and only re-commences again once familiarity with the stimulus has subsided.

By this process, the preference-feedback hypothesis describes how Berlyne's theory may explain the positive relationship between liking and exposure identified in some studies (e.g. Zajonc, 1968). Despite this potential however, the preference-feedback hypothesis has been largely neglected by researchers, although it is worth noting that

in perhaps its only direct test, Colman, Best, and Austen (1986) failed to confirm its predictions for a variety of Class B non-musical stimuli: instead there were generally positive monotonic relationships between measures of liking and familiarity for both Class A and B stimuli. However, it is worth noting that Martindale's (1990) evolutionary theory makes some very similar predictions to the preference-feedback hypothesis concerning fluctuations over time in the arts, and this theory has received some empirical support. (Note also that whilst this thesis considers familiarity only in the context of the preference-feedback hypothesis, the reader is referred to Finnas (1989), Hargreaves (1986), and Sluckin, Hargreaves, and Colman (1983) for reviews of the more general research on the liking-familiarity relationship.)

The 'preference-for-prototypes' model Several recent studies of preference for mainly non-musical stimuli have investigated the effects of stimulus prototypicality, which may be defined as the degree to which a given stimulus is typical of its class. This is the third approach to preference investigated in this Part of the thesis. Studies of object classification have indicated that we classify stimuli by successfully matching them with an abstract schema, or 'prototype', representing the appropriate category (Posner and Keele, 1968; Reed, 1972). In other words, our everyday experiences are classified more easily if they correspond with a prototype for that kind of experience. Martindale and Moore (1988) drew on this theoretical background in proposing a theory concerning prototypicality and preference that is based on cognitive psychological research on neural networks. The theory states that the mind is composed of inter-connected cognitive units which differ in the strength with which they can become activated (see e.g. Martindale, 1981). Units coding more prototypical stimuli are activated more frequently, and are therefore claimed to be stronger than those coding atypical stimuli.

Martindale and Moore claim that 'aesthetic preference is hypothetically a positive function of the degree to which the mental representation of a stimulus is activated. Because more typical stimuli are coded by mental representations capable of greater activation, preference should be positively related to prototypicality' (p. 661, see also Whitfield and Slatter, 1979; and Whitfield, 1983). More simply, typical instances of a category should be preferred because they lead to a stronger activation of cognitive representations. To give an extreme example for the sake of clarity, light brown four-legged dogs should be preferred to bright pink three-legged dogs because the former possess the characteristics of dogs that are most typically experienced. Similarly, liking for bright pink four-legged and light brown three-legged dogs should fall

somewhere in between liking for the other two, since they possess *some* of the typical characteristics of dogs.

Martindale and Moore (1988) also present a slight variation of this basic theory in proposing that when the most typical instance of a category is activated, moderately prototypical stimuli may be liked less than atypical instances of that class. This means that the relationship between liking and prototypicality may also at times take the form of a U-shaped function. This effect is explained as resulting from the cognitive organisation of category members. Martindale and Moore assert that the members of a class are connected in a lateral inhibitory framework, in which similar exemplars of a class are located close to one another. Activation of the most typical member of the class inhibits the activation of similar instances: less similar instances are less inhibited by virtue of their greater distance from the activated exemplar. Consequently, a U-shaped relationship may arise between preference and the extent to which stimuli initiate cognitive activity. Note also that if the activation of moderately typical exemplars is inhibited to a lesser degree then this should give rise to a positively accelerating relationship between liking and prototypicality.

Relationship between the collative variables and prototypicality Research on preference for prototypes has frequently considered the relative extent to which prototypicality and stimulus arousal potential are able to explain liking for aesthetic objects: the consistent conclusion of this research has been that variations in aesthetic responses are more closely associated with stimulus prototypicality. For example, Moore and Martindale (1983) report that colour typicality accounted for 79% of the explained variance in preference for random polygons, whereas complexity accounted for only 1%. Martindale and Moore (1989) report that complexity accounted for 4% of the explained variance in preference for classical music themes, whereas 51% of the variance was accounted for by 'meaningfulness' (the resemblance between the experimental stimuli and real-world stimuli). Similarly, Martindale, Moore, and Borkum (1990) report seven experiments that investigated preference for polygons, line drawings, and paintings. Meaningfulness consistently explained more of the variance in preference for these stimuli than did complexity. Similar results are reported by e.g. Hekkert and van Wieringen (1990); Whitfield (1983); and Whitfield and Slatter (1979). Martindale, Moore, and West (1988) argue that results such as those described here 'suggest that collative variables are probably a good deal less important in determining preference than Berlyne thought them to be. Furthermore, they probably determine preference via mechanisms different than those proposed by Berlyne' (p. 94).

On the most basic level, findings such as those described (briefly) above indicate that musical preferences are predictable on the basis of specific variables, and this part of the thesis describes 5 studies which provide different tests of Berlyne's theory, the preference-feedback hypothesis, and the preference for prototypes model. The first study, described in Chapter 2, is a small pilot study of the relationship between verbal and behavioural measures of musical preference in the context of Berlyne's theory: do subjects actually choose to listen to moderately arousing music, and do verbal and behavioural responses to music correlate with one another ? The remaining chapters in this part represent various attempts to test the generality of the three theories described above. The second study, described in Chapter 3, attempts to link preferential and more specific affective responses to music by means of Berlyne's theory. Two studies, described in Chapters 4 and 5, investigate the extent to which preference for musical stimuli is determined by the musical style in which they are played, and whether responses to musical styles can be explained in terms of their familiarity. A fifth study, described in Chapter 6, considers the relative importance of complexity and prototypicality in explaining musical preference, and attempts to reconcile Berlyne's theory and the preference for prototypes model. The study also investigates the effects of musical training on preference for different levels of musical complexity.

Chapter 2. Verbal and Behavioural Responses to Music

This chapter investigates the degree of correspondence between verbal and behavioural responses to music. The majority of experimental studies of musical preference have tended to employ only verbal measures of musical preference, and perhaps make the underlying assumption that these are related to the amount of time subjects would spend actually listening to particular pieces. Although verbal ratings have the advantage of permitting large groups of subjects to be tested within a single session, there is little direct evidence concerning the relationship between these responses and actual listening behaviour: in short, do subjects listen to the music that they say they like ?

A small number of studies have employed behavioural measures of musical preference, often by means of an Operant Music Listening Recorder (or OMLR, see Cotter and Toombs, 1966; Cotter and Spradlin, 1971; and a brief review of the OMLR literature by Hargreaves, 1986). This consists of a push-button switching box connected to an event timer and recorder running on a conventional PC. Several music channels run simultaneously, and subjects are free to select between these at will by pressing the appropriate button on the switch-box: during this time, the computer records the amount of time spent listening to and the selection order of the different channels. It is perhaps also worth noting that a few other studies (e.g. Madsen and Frederickson, 1993) have studied behavioural measures of musical preference obtained through a Continuous Response Digital Interface (or CRDI). This contains a scrolling piece of paper on which the subject moves a pen up or down in order to indicate increases and decreases in liking for a musical piece as it progresses: this allows the researcher to determine particular 'hot spots' within the music.

Kuhn, Sims, and Shehan (1981) found correlations of +0.09, +0.58, and +0.59 between measures of preference derived from an OMLR and verbal ratings of liking for three musical pieces, and this degree of correspondence seems reasonably typical (see e.g. Morgan and Lindsley, 1966; Pantle, 1978; Geringer, 1982), with Hargreaves (1986) concluding that the average correlation seems to fall around +0.50: he adds that this level would be expected on the basis of other non-musical studies in the field of attitude measurement. The principal aim of the present small-scale study was to determine the degree of correlation between verbal ratings of musical preference (e.g. ratings on a 0-10 scale for 'like-dislike') and a behavioural measure of actual listening time derived from an OMLR (see also Chapter 11).

In a similar vein, several studies of Berlyne's theory (e.g. those cited in Chapter 1) have investigated verbal reports of the extent to which music is perceived as possessing arousal-evoking properties. A reasonable amount of data collected during the 1960s and 1970s demonstrates that these verbal reports do correlate with physiological indices of arousal such as heart rate, and EEG and GSR recordings (see e.g. Bartenwerfer, 1963; 1969; Godkewitsch, 1974; and Thayer, 1967; 1970). Although there is no reason to suspect that this relationship should have altered, the present study also provided an opportunity to gather more evidence on this.

A secondary aim of the present study was to provide a behavioural test of Berlyne's theory. Several studies referred to in Chapter 1 have indicated that there is an inverted-U relationship between the arousal-evoking qualities of music and verbal reports of musical preference. However, there is much less data on whether subjects prefer to *listen to* moderately arousing pieces. Berlyne (1971; 1974) cites a small number of studies of artificially-generated 'tonal stimuli' which support this hypothesis, and there is also a limited amount of behavioural evidence in support of his theory presented by two studies in which subjects have been exposed to more naturalistic music: Hargreaves (1987-1988) found that subjects spent longer listening to moderately familiar than completely unfamiliar music, and Holbrook and Gardner (1993) presented subjects with 32 taped musical performances, demonstrating that they listened longest to those that were moderately arousing.

In light of these two aims, subjects in the present study were asked to select between three pieces that were simultaneously available on an OMLR. Through manipulations of two of their psychophysical properties, namely tempo and volume, these three pieces possessed different arousal-evoking qualities, and this was further established by means of verbal ratings and also measures of subjects' pulse rates. At the end of the study, subjects rated their liking for the three pieces, and the three hypotheses were first, that these verbal ratings of liking should correlate with their earlier listening times; second, that verbal reports of the extent to which the music was arousing should be correlated positively with measures of heart rate; and third, that the moderately arousing piece should receive higher liking ratings and be listened to for longer than either the comparatively arousing or unarousing pieces.

Method

Subjects 38 subjects (16 males, 22 females) aged between 18 and 25 (mean = 21.27 years) took part in the study. To provide further information on the sample, a panel of

three independent judges assessed a self-report of musical training and experience made by subjects, and determined that 12, 17, and 9 subjects possessed low, intermediate, and high levels respectively.

Stimuli and apparatus Two specially-prepared pieces of music were employed in the study, and a low arousal (LA), moderate arousal (MA), and high arousal (HA) version of each was subsequently derived. Two pieces were employed so as to avoid subjects' responses being an artefact of one specific piece. Both pieces were performed on a Korg SG-1D sampling grand MIDI keyboard with a Roland MT-32 sound module. The pieces were then recorded onto a Roland PR-100 sequencer. Both pieces comprised a rhythm track in 4/4 time, in conjunction with several multi-tracked synthesiser parts composed so that each piece might be loosely labelled as modern popular dance music, a style with which subjects could reasonably be expected to be well acquainted.

Both pieces were then recorded onto separate tapes on a Teac A-3440 reel-to-reel multi-track tape recorder, so that each tape contained an LA, MA, and an HA version of one of the pieces with each of these three versions on a separate track. The three versions were recorded so that they ran concurrently on the tape. The LA, MA, and HA versions of each piece were derived by manipulating two of their psychophysical properties, namely tempo and volume. The tempo manipulation was carried out by recording the two versions at 80, 110, or 140 bpm respectively. This was done by varying the tempo wheel of the sequencer so that the two versions of each piece did not vary in pitch. The volume at which each version was reproduced by the tape recorder was manipulated by varying its output level. This meant that for each piece, the LA version was at 80 bpm and its volume was 60 dB, the MA version was at 110bpm and its volume was 70 dB, whilst the HA version was at 140 bpm and its volume was 80 dB. The three versions were identical in every other respect.

From the tape recorder, the music was played through an Operant Music Listening Recorder (OMLR). This device allowed the user to select between the three tracks that were available on the tape by means of three push-buttons. From the OMLR, the music was played through a pair of Panasonic earphones that could be fitted within the ear via a Laney Linebacker 30W amplifier. Although the study was conducted in a sound proof room, earphones were used so as to eliminate any extraneous sounds. Finally, each subject's pulse rate was measured by means of a heart rate monitor attached to the index finger of his/her right hand.

Design and procedure Only one of the two pieces was employed in each session, and the use of these two pieces was counterbalanced by subject gender. On entering the laboratory, subjects were seated in front of the tape recorder, and were asked to put on the headphones and the pulse meter. After one minute, the subjects were asked to listen to the initial 90 seconds of all three versions of the piece in use. This served three purposes; to allow the experimenter to take the subject's pulse at the end of each 90-second excerpt (so as to provide an index of the arousal level evoked by each version); to allow the experimenter to point out that the only way in which the versions varied was in their tempo and volume, such that the three versions were otherwise identical; and to familiarise subjects with the operation of the OMLR push buttons in selecting a particular version of the piece. The presentation order of the 90-second excerpts was fully counterbalanced.

Subjects were told that they would be asked to listen to one of the three versions with which they had just been presented, and it was stressed that they were free to listen to whichever of the three versions they wanted to. Subjects were then told that they could change to a different version at any time as often as they chose simply by pressing the appropriate button on the OMLR. Once the subject had stated which of the three versions he/she would like to hear initially, the experimenter started the music and the OMLR, which recorded subjects' musical selections over the following 5 minutes.

Afterwards, subjects were asked to rate each version in terms of how much they 'liked it' on a scale from 0 ('not at all') to 10 ('very much'), and how 'arousing versus relaxing' it was on a scale from 0 ('very relaxing') to 10 ('very arousing'). Subjects were played a 15-second reminder excerpt before rating each version since these were only identified throughout the experiment as 'this version' or 'that version'. The order in which the three versions were rated was fully counterbalanced.

Results and Discussion

Differences between the two pieces Four 2 (piece) x 3 (version, i.e. LA, MA, HA) mixed ANOVAs were carried out to investigate possible differences between responses to the two pieces employed on measures of subjects' pulse rates, listening times, and verbal ratings of liking and the extent to which the music was arousing. In these analyses, 'piece' was a between-subjects factor whereas 'version' was treated within-subjects. None of these analyses yielded any significant main effects of 'piece'

or interactions between 'piece' and 'version' ($1.26 < F > 0.13$), and so subjects' responses to the two pieces were aggregated in subsequent analyses.

Verbal and behavioural responses to music A separate product-moment correlation was calculated for each of the LA, MA, and HA versions to investigate the relationship between listening time and subjects' verbal liking ratings. The results of these were +0.46, +0.43, and +0.47 respectively ($N = 38$, $p < 0.01$ in all cases) which indicates that liking ratings were related positively to actual listening time. Separate product-moment correlations were then calculated for each of the LA, MA, and HA versions to investigate the relationship between subjects' heart rate when listening to each and their verbal ratings of how arousing each version was. The results of these were +0.51, +0.44, and +0.47 respectively ($N = 38$, $p < 0.01$ in all cases), which indicates a positive relationship between verbal and physiological measures of musically-evoked arousal.

Arousal-evoking qualities of the music Two separate one-way repeated measures ANOVAs were carried out on subjects' ratings of how arousing the three versions were, and on their pulse rates whilst listening to short excerpts of the three versions at the beginning of the experiment. The mean ratings assigned to the LA, MA, and HA versions were 2.45, 5.34, and 8.24 respectively ($F = 209.47$, d.f. = 2, 74, $p < 0.001$) with Tukey HSD tests indicating that all three values differed significantly from one another. The mean pulse rates in response to the LA, MA, and HA versions were 86.84, 93.03, and 101.18 ($F = 109.10$, d.f. = 2, 74, $p < 0.001$) with Tukey HSD tests indicating that the HA version produced significantly higher rates than the other two. Although the difference between the LA and MA versions was non-significant, the pattern of mean pulse rates in conjunction with subjects' verbal ratings indicates that the three versions did possess the predicted arousal-evoking qualities.

Relationship between arousal and musical preference A one-way repeated measures ANOVA was carried out to investigate differences in the time spent listening to the LA, MA, and HA versions of the pieces. The mean listening times in milliseconds were 94299.97, 137918.53, and 90254.24 respectively, although these did not differ significantly from one another ($F = 1.21$, d.f. = 2, 74). A similar non-significant pattern was found by a one-way repeated measures ANOVA on subjects' verbal ratings of liking for the LA, MA, and HA versions of the pieces. These gave rise to means of 5.16, 5.94, and 4.95 respectively ($F = 2.09$, d.f. = 2, 74). Both these results indicate that moderately arousing music was preferred, although this effect did *not* attain statistical significance.

A series of curvilinear regression analyses was carried out to investigate the degree of linear and quadratic relationship between the two measures of musically-evoked arousal (i.e. pulse and verbal rating) and the two measures of liking for the music (i.e. listening time and verbal rating). The results of these are reported in Table 2.1, and indicate that the only significant result concerned the quadratic relationship between verbal ratings of both musical preference and musically-evoked arousal. The regression equation for this was $Y = 4.53 + 0.64X - 0.07X^2$, which indicates that the data conformed to an inverted-U function, consistent with Berlyne's theory. However, the value of R^2 indicated that this relationship was weak, explaining only 7.2% of the variance in these data.

In conclusion, this small-scale study indicates that there was only weak and generally non-significant evidence of an inverted-U relationship between musical preference and the arousal evoked by music. Actual listening time was positively related to a verbal measure of musical preference, and there was a similar correlation between subjects' pulse rates and their verbal ratings of the extent to which the music was arousing. These latter two findings indicate a degree of correspondence between verbal and behavioural responses to music that is similar to that found by previous research.

To put these findings in the context of the remainder of the thesis, it is worth noting that verbal and behavioural measures of responses to music both have inherent advantages and disadvantages. For example, verbal reports facilitate the testing of subjects in groups and may be the only measurements possible in a given research design, although they do neglect actual listening behaviour: in contrast, behavioural measures allow a direct investigation of such behaviour, but may be impractical and also neglect subjects' *perception* of a given piece of music: these perceptions may well be as important as listening behaviour. Given the advantages and disadvantages associated with both verbal and behavioural measurement approaches, the correlations reported here suggest that both types of response may be employed in research on musical preference.

Measure of musical arousal	Measure of musical preference	Model	F	d.f.	p
Verbal rating	Listening time	Linear	0.07	112	n.s.
Verbal rating	Listening time	Quadratic	1.63	111	n.s.
Verbal rating	Verbal rating	Linear	2.25	112	n.s.
Verbal rating	Verbal rating	Quadratic	4.28	111	< 0.02
Pulse	Listening time	Linear	0.02	112	n.s.
Pulse	Listening time	Quadratic	0.20	111	n.s.
Pulse	Verbal rating	Linear	0.02	112	n.s.
Pulse	Verbal rating	Quadratic	0.11	111	n.s.

Table 2.1 - Curvilinear regression analyses between musical preference and the arousal evoked by music

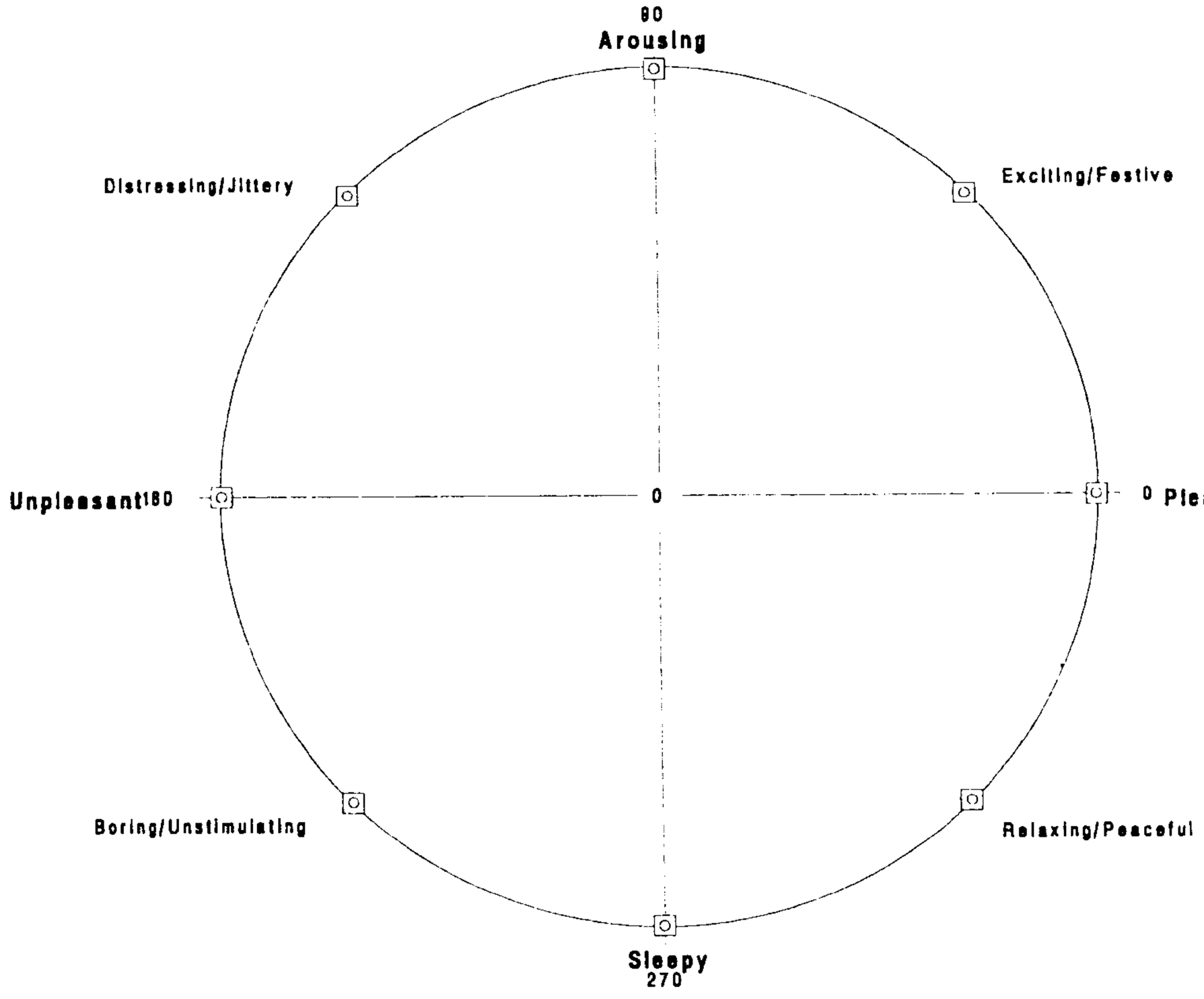
Chapter 3. Liking, Arousal Potential, and the Emotions Expressed by Music

Recent years have seen a resurgence of interest in emotional responses to music (see e.g. Sloboda, 1991; special issue of *Psychology of Music* (1996), Vol. 24.1). The present chapter concerns how Berlyne's theory might relate to this aspect of aesthetic responses, since recent research on the psychology of affect suggests that emotional aspects of stimuli may be closely associated with the pleasing and arousing qualities of those stimuli. The study described here attempts to test this relationship with musical stimuli by considering the relationship between their pleasing and arousal-evoking qualities, and the extent to which that music is perceived as expressing different emotions.

Previous research has considered Berlyne's theory only in terms of *liking* for music. However, preference is only one aspect of music listening in everyday life. Several researchers (e.g. Rolls, 1975) have discussed the psychophysiological similarities between pleasure and emotion, and it seems reasonable to assume that musical selections are probably guided just as much by the specific emotional content of the music as they are by the desire to hear liked music. Consider for example two everyday music listening situations, namely a party and a romantic candlelit dinner. Whilst the music selected for both will be that which is liked, it seems probable that the specific pieces chosen will display quite different characteristics, with those pieces chosen for the former situation probably being much more upbeat and energetic (see Chapter 10). Emotional and preferential responses are both important in listening to music, and the relationship between these two aspects of musical behaviour deserves further investigation: if we can study emotional and preferential responses together rather than in isolation, then we may be better able to describe aesthetic responses to music.

<u>The circumplex theory of emotion</u> In recent years, a great deal of research has focused on what has been termed the circumplex theory of emotion (see e.g. Larsen and Diener, 1992; Reisenzein, 1994). In this, affective judgements are conceptualised in a circular structure referred to as a 'circumplex'. The circumplex contains two dimensions - 'arousing-sleepy', and 'pleasant-unpleasant'. It is claimed that the majority of emotional experiences may be arranged around the circumference of the circle, and be adequately characterised in terms of their position relative to the 'arousal-sleepy' and 'pleasant-unpleasant' dimensions. Figure 3.1 summarises the circumplex theory, and illustrates the approximate locations of a representative number of emotions.

Figure 3.1 - Summary Of The Circumplex Theory Of Emotion



Adapted from Larsen and Diener (1992) and Russell, Ward and Pratt (1981)

The main features of the circumplex theory were illustrated in some early research by Russell, Ward, and Pratt (1981), who asked subjects to rate different environments in terms of one hundred and five commonly used adjectives. A factor analysis of these responses gave rise to 'Two, independent, bipolar factors of affective quality - pleasing and arousing quality' (p. 259). Moreover, the positioning of each particular adjective relative to these two dimensions represented a meaningful combination of pleasing and arousing quality. For example, 'exciting' was located as a combination of high arousal and pleasantness, 'peaceful' was located as a combination of low arousal and pleasantness, 'boring' was located as a combination of low arousal and unpleasantness, and 'frightening' was located as a combination of high arousal and unpleasantness.

In reviewing the literature on the circumplex theory, Larsen and Diener (1992) cite several supporting studies that have investigated self-reports of mood (Russell, 1978), responses to facial expressions (Russell and Bullock, 1985), responses to environments (Russell and Pratt, 1980), and anticipated reactions to events (Russell and Mehrabian, 1977). Moreover, the circumplex theory has received support in the self-report ratings of native speakers of Swedish (Sjoberg, Svensson, and Persson, 1979), Japanese (Watson, Clark, and Tellegen, 1988), Israeli (Almagor and Ben-Porath, 1989), Greek, Polish, and Estonian (Russell, Lewicka, and Niit, 1989), and Chinese, Croatian, and Gujurati (Russell, 1983). In conjunction, these findings indicate that emotional responses to a variety of stimuli may be explained in terms of their pleasing and arousal-evoking qualities. In light of such positive findings it would be interesting to investigate whether similar principles can explain one of the most prevalent affect-eliciting stimuli, namely music.

As noted above, there is a need for research that considers the relationship between liking for music and more specific emotional aspects of this stimulus, and the circumplex theory and Berlyne's theory may be seen as both employing very similar dimensions in explaining emotional and preferential responses to stimuli respectively: both theories would consider pleasantness and arousal to be fundamental aspects of subjects' responses to music. Moreover, research on the circumplex theory suggests that measures of 'liking' and 'arousal potential' and the specific emotions expressed by musical stimuli may overlap to a considerable extent. For example, the circumplex suggests that a musical excerpt that is liked and of high arousal potential *is* exciting or festive: the emotions expressed by music are inseparable from its pleasing and arousing qualities, since the emotional content of music is a direct result of these qualities. This means that it may be possible to reduce the emotions expressed by musical stimuli to their pleasing and arousing qualities.

Aim and hypotheses The present study aims to demonstrate that the emotions expressed by musical excerpts may be predicted and explained on the basis of a characterisation of those excerpts in terms of liking and arousal potential. It should be noted that the study concerns perceptions of the emotions *expressed* by music, rather than those *experienced* by the listener as a result of listening to such a stimulus. Several authors (in particular Meyer, 1956) have noted a possible distinction between these concepts. 'Emotions' are taken as referring to differentiated and specific affective states (e.g. 'bored'), whereas 'liking' refers to an unspecified positive affective response. Thirty-two musical excerpts were rated by independent groups of subjects on scales of 'liking' and 'arousal potential' *or* the extent to which they expressed eight different emotions. It should be made explicit at this point that the present research aims only to investigate the similarity between the pleasing and arousing qualities of musical excerpts and the emotions that those excerpts express, and although the study is based on the circumplex theory, it does not aim to directly test this theory per se.

The experimental hypotheses can be best expressed in terms of an adaptation of the circumplex theory which is depicted in Figure 3.2. In this figure, the circumplex is divided into four quadrants, with each representing different combinations of liking and arousal potential. On the basis of research on the circumplex theory cited above, 8 emotions have been hypothetically located within the figure as representing meaningful combinations of liking and arousal potential. The greatest difference between Figure 3.2 and the conventional circumplex presented in Figure 3.1 is that the axes have been rotated in the former. Note also that the 'arousing-sleepy' dimension has been re-labelled as 'high arousal potential-low arousal potential', and the 'pleasant-unpleasant' dimension has been re-labelled as 'like-dislike'. These changes represent a formulation of the circumplex that corresponds with Berlyne's research on aesthetic stimuli (and also that reported in the remainder of this thesis), and are justifiable in that as noted above, the present research does not attempt to test the circumplex theory per se. The degree of similarity between Figure 3.2 and the circumplex theory is discussed below.

Four hypotheses can be formulated. The first is that multiple regression analyses should indicate that ratings of liking and arousal potential are both significant predictors of ratings of each emotion. The second hypothesis is that 'liking' and 'arousal potential' dimensions should emerge from a factor analysis of subjects' ratings on the emotion scales. The third hypothesis is based on the use of mean liking and arousal potential ratings to assign excerpts to specific quadrants of Figure 3.2:

Figure 3.2 - An Adaptation of the Circumplex Theory

Like

Relaxing/Peaceful

QUADRANT 1

Exciting/Festive

QUADRANT 2

Low Arousal Potential

High Arousal Potential

Boring/Unstimulatng

QUADRANT 4

Unsettling/Disconcerting

QUADRANT 3

Dislike

excerpts within each quadrant should be rated most highly on those emotions associated with that quadrant by Figure 3.2. Excerpts assigned to Quadrant 1 should receive higher ratings on scales of 'relaxing' and 'peaceful' than should excerpts assigned to other quadrants; excerpts assigned to Quadrant 2 should receive higher ratings on scales of 'exciting' and 'festive' than should excerpts assigned to other quadrants; excerpts assigned to Quadrant 3 should receive higher ratings on scales of 'unsettling' and 'disconcerting' than should excerpts assigned to other quadrants; and excerpts assigned to Quadrant 4 should receive higher ratings on scales of 'boring' and 'unstimulating' than should excerpts assigned to other quadrants. The final hypothesis is that there should be inverted-U relationship between ratings of liking and arousal potential.

Method

Subjects In an initial sample, 60 subjects volunteered for the study. All were studying introductory courses in psychology at three colleges in the suburbs of a city in the East Midlands region of the U.K. Mean age was 18.57 years (s.d. = 5.42, range = 16-40 years). Thirty subjects (15 males, 15 females) were randomly assigned to a group which rated the excerpts on all eight of the emotions depicted in Figure 3.2, and the remaining volunteers (16 males, 14 females) were assigned to a group which rated the excerpts for 'liking' and 'arousal potential'. To provide further information on the sample, a panel of three independent judges assessed a self-report of musical training and experience made by subjects, and determined that 29, 17, and 14 subjects possessed low, intermediate, and high levels respectively.

To check the reliability of any effects that may obtain, a second sample of 60 subjects (40 males, 20 females) was derived approximately 6 months after the first from students at a fee-paying school in a rural area of the East Anglia region of the U.K. Mean age was 17.37 years (s.d. = 0.48, range = 17-18 years). All were studying non-psychology further education courses. Equal numbers of males and females were randomly assigned to one of the two experimental groups described above. To provide further information on this second sample, the same three independent judges as above assessed a self-report of musical training and experience made by subjects, and determined that 11, 23, and 26 subjects possessed low, intermediate, and high levels respectively.

Experimental stimuli Thirty-two non-vocal musical excerpts were employed, each of one minute duration. Pop music was employed since this style could most reasonably

be expected to elicit a full range of ecologically valid liking ratings from the subjects. The pieces selected were thought to represent points toward the extremes of 'liking' and 'arousal potential': Figure 3.2 indicates that excerpts located on the midpoint of these dimensions should be assigned equal ratings on each of the emotion scales, thus failing to test whether the emotions expressed by music vary with different combinations of liking and arousal potential.

The 32 excerpts were recorded in two random orders on separate audio tapes. On the basis of a small pilot study, subjects rating the excerpts on the emotion scales were allowed 25 seconds between excerpts to assign their ratings whilst subjects rating the excerpts on scales of liking and arousal potential were allowed 10 seconds between excerpts to assign their ratings. In addition, four practice excerpts (selected so as to represent putatively each of the quadrants from Figure 3.2) were recorded at the beginning of the tapes. Details of the excerpts are presented in Appendix 3.1.

Design Within each of the two samples, 30 subjects rated each excerpt on separate 11-point scales for the extent to which it expressed each of the following emotions; 'relaxing', 'peaceful', 'exciting', 'festive', 'unsettling', 'disconcerting', 'boring', and 'unstimulating'. On these scales, a rating of 10 represented full expression of that emotion, whilst a rating of 0 represented that the excerpt was neutral on that scale. This method was used due to controversy in the literature regarding the bi-polarity of affect (see e.g. Russell, 1979). The 8 adjectives possess face validity as typical emotions expressed by music, and were derived from research on the circumplex theory.

The remaining 30 subjects within each sample were assigned to a second independent group which used 11-point scales to rate how much they liked the pieces, and also how arousing they thought the pieces were. On these two scales, a rating of 10 represented 'like very much' or 'highly arousing', and a rating of 0 represented 'dislike very much' or 'not at all arousing'. Highly arousing music was defined as erratic, difficult to predict, and of quick tempo, whilst music of low arousal-evoking qualities was defined as monotonous, very predictable and of slow tempo (see Berlyne, 1971). Each of the two excerpt orderings was presented to 15 subjects from each of the two groups within each sample. All the subjects were asked to circle any ratings assigned to pieces they had heard previously, and these ratings were discarded from the analyses.

Procedure Groups of subjects were tested in lecture rooms located within their college, and were seated such that they could not see each other's responses. They read instructions from the top of their response sheets, which were verbally reinforced by the experimenter. Having established that these had been understood, the four practice excerpts were played and rated to allow subjects to become familiar with the rating scales. This data was excluded from analysis. Following any subsequent questions, the 32 experimental excerpts were then played, and subjects rated each immediately after its presentation. Subjects were instructed to consider the ratings they would assign as each excerpt was playing.

Results

Order effects A product-moment correlation coefficient was calculated between the two excerpt orderings for each of the rating scales, using the mean ratings assigned to each excerpt. The coefficients ranged between +0.93 and +0.99 ($N = 32$, $p < 0.001$ in all cases). This means that the possibility of order effects influencing the results can be ruled out.

Reliability A product-moment correlation coefficient was calculated between the two samples for each of the rating scales, using the mean ratings assigned to each excerpt. The coefficients ranged between +0.93 and +0.99 ($N = 32$, $p < 0.001$, in all cases). This means that despite the apparent differences in their socio-economic background, education in psychology, locale, and level of musical training, the data obtained from the two samples cross-validate one another, and they were pooled in subsequent analyses.

Regression of liking and arousal potential upon emotion ratings Multiple regression analyses were calculated using the mean ratings assigned to each excerpt to determine the extent to which ratings of liking and arousal potential regressed upon ratings of each emotion. The results of these analyses are presented in Table 3.1. In this table, R^2 x 100 represents the percentage of variance in ratings of each emotion accounted for by liking and arousal potential together (see Kerlinger and Pedhazur, 1973). The table shows that ratings of liking and arousal potential together regressed significantly upon each emotion, and accounted for a high percentage of the variance on each emotion scale. Also, liking and arousal potential were both independently associated with ratings on each emotion scale. In conjunction, these results show that ratings of liking and arousal potential were closely associated with the emotions expressed by the musical stimuli.

Emotion Scale	F-ratio	d.f.	p	R^2 x 100	'Liking' T-value	p	'Arousal' T-value	p
Relaxing	43.79	2, 29	< 0.001	75.12	+7.71	< 0.001	-6.88	< 0.001
Peaceful	32.63	2, 29	< 0.001	69.24	+5.95	< 0.001	-6.64	< 0.001
Festive	31.05	2, 29	< 0.001	68.17	+4.96	< 0.001	+4.88	< 0.001
Exciting	76.69	2, 29	< 0.001	84.10	+5.18	< 0.001	+9.83	< 0.001
Unsettling	51.60	2, 29	< 0.001	78.06	-9.63	< 0.001	+5.28	< 0.001
Disconcerting	47.12	2, 29	< 0.001	76.47	-9.36	< 0.001	+4.57	< 0.001
Boring	107.69	2, 29	< 0.001	88.13	-11.24	< 0.001	-6.73	< 0.001
Unstimulating	75.75	2, 29	< 0.001	83.93	-9.73	< 0.001	-5.21	< 0.001

Table 3.1 - Summary of regressions of liking and arousal potential upon ratings of each emotion

Factor analysis A factor analysis was carried out on subjects' emotion ratings. The unrotated principal components solution yielded three factors with eigenvalues greater than one, and these accounted for 84.7% of the variance. Factors 1 and 2 alone accounted for 68.6% of the variance. Details of the factors are presented in Table 3.2. 'Boring', 'unstimulating', 'disconcerting', and 'unsettling' load positively on Factor 1, and 'exciting', 'festive', 'peaceful', and 'relaxing' load negatively on this factor. Negative loading emotions are those that are generally favourable, and positive loading emotions are those that are generally unfavourable so that Factor 1 could be interpreted as a 'like-dislike' dimension. 'Boring', 'unstimulating', 'peaceful', and 'relaxing' load positively on Factor 2, and 'disconcerting', 'unsettling', 'exciting', and 'festive' load negatively on this factor. Note that the loadings of 'disconcerting', and 'unsettling' were rather weak. However, the general pattern indicates that negative loading emotions are arousing, and positive loading emotions represent comparatively pacified states so that Factor 2 could be interpreted as a 'low arousal potential-high arousal potential' dimension. The final factor recovered, Factor 3, had a much lower eigenvalue (1.29). 'Disconcerting', 'unsettling', 'peaceful', and 'relaxing' load positively on this factor, and 'boring', 'unstimulating', and 'festive' load negatively (with a loading of 0 for 'exciting'). The general pattern of loadings remains of interest however, by indicating that the factor could be best labelled as 'high/low liking *and* arousal potential-high/low liking *or* arousal potential': negative loading emotions are those that are high or low on *both* liking and arousal potential, whereas positive loading emotions are those that are high or low on *either* liking *or* arousal potential.

Differences in emotion ratings between quadrants The mean liking and mean arousal potential ratings were calculated for each of the 32 excerpts. Each excerpt was subsequently located within one of the four quadrants of Figure 3.2 on the basis of whether the mean liking and arousal potential ratings were above or below the mid-point (i.e. 5) of the two rating scales. On this basis, Quadrant 1 contained 4 excerpts; Quadrant 2 contained 10 excerpts; Quadrant 3 contained 8 excerpts; and Quadrant 4 contained 10 excerpts. The surprisingly small number of excerpts assigned to Quadrant 1 is attributable to several being assigned lower than expected 'liking' ratings, and subsequently being located within Quadrant 4. This means that analyses of the excerpts located within Quadrant 1 must be interpreted with a degree of caution.

The mean ratings on each of the emotion scales were then calculated for each excerpt, and a one-way independent subjects ANOVA was calculated for each emotion scale to test differences in the mean ratings assigned to excerpts between each of the four quadrants. Table 3.3 presents the mean ratings assigned on each emotion scale

Emotion scale	Factor 1	Factor 2	Factor 3
Boring	+0.68	+0.43	-0.45
Disconcerting	+0.77	-0.22	+0.51
Exciting	-0.41	-0.78	
Festive	-0.46	-0.62	-0.39
Peaceful	-0.55	+0.70	+0.30
Relaxing	-0.63	+0.63	+0.30
Unsettling	+0.76	-0.27	+0.52
Unstimulating	+0.65	+0.41	-0.48
Eigenvalue	3.13	2.36	1.29
% of variance	39.2	29.5	16.1

Table 3.2 - Factor analysis of emotion ratings assigned to the experimental excerpts

Emotion Scale	Quadrant 1 Excerpts	Quadrant 2 Excerpts	Quadrant 3 Excerpts	Quadrant 4 Excerpts	F	d.f.	p
Relaxing	8.08	2.18	1.03	1.21	83.82	3, 28	< 0.001
Peaceful	7.99	1.10	0.81	1.19	105.09	3, 28	< 0.001
Exciting	2.65	7.44	3.88	0.37	62.62	3, 28	< 0.001
Festive	1.61	6.38	1.50	0.26	44.99	3, 28	< 0.001
Unsettling	0.86	1.23	6.77	2.39	43.81	3, 28	< 0.001
Disconcerting	0.90	0.94	6.41	2.45	43.84	3, 28	< 0.001
Boring	2.99	2.13	4.18	9.03	30.99	3, 28	< 0.001
Unstimulating	2.92	2.34	4.12	8.73	29.82	3, 28	< 0.001

Table 3.3 - Summary of one-way independent subjects ANOVAs on the mean emotion ratings assigned to excerpts within each quadrant

between all four quadrants, and the associated F-ratios and significance levels. Tukey HSD tests were conducted for each of these ANOVAs. These indicated that within each emotion scale, the highest mean rating x quadrant combination was significantly higher than the three other mean rating x quadrant combinations, and the pattern of these differences is consistent with the predictions of the adapted circumplex model presented in Figure 3.2.

Relationship between liking and arousal potential Curvilinear regression analysis was carried out on the raw liking and arousal potential ratings. Although the data was significantly fitted to a linear model ($F = 82.75$, d.f. = 1878, $p < 0.001$), a high level of significance was also obtained for the fit of the data to a quadratic model ($F = 83.19$, d.f. = 1877, $p < 0.001$). Moreover, the value of R^2 associated with the quadratic model was greater than that associated with the linear model ($R^2 = 0.08$ and 0.04 respectively), indicating that the quadratic model (although fitted only weakly) explains more of the variance in subjects' ratings of these variables. The regression equation for the quadratic model was $Y = 1.25 + 1.11X - 0.08X^2$, indicating that the relationship between liking and arousal potential ratings can be best described as an inverted-U function.

Discussion

The results indicate that the extent to which emotions were expressed by musical stimuli was predictable on the basis of independent ratings of liking and arousal potential. This means that these aspects of responses to music may be closely associated. Multiple regression analyses indicated that mean ratings of liking and arousal potential regressed significantly upon mean ratings assigned on each emotion scale. The strength of this relationship is given by the values of R^2 obtained, with liking and arousal potential together predicting between 68% and 88% of the variance in the 8 emotion scales.

Further insight into the relationship between the pleasing and arousing qualities of the excerpts and the specific emotions they expressed was produced by a factor analysis of the emotion ratings. Although the results of this are not entirely surprising given that the 8 emotions were selected to be clearly within the liking and arousal potential quadrants of Figure 3.2, 'like-dislike' and 'high arousal potential-low arousal potential' factors explained a substantial proportion (68.6%) of the variance in subjects' emotion ratings. This again suggests that the emotions expressed by musical excerpts are interdependent with their pleasing and arousing qualities. Given the predictions of the

circumplex theory, it is slightly disappointing that a comparatively weak third factor (eigenvalue = 1.29) was also recovered, and this appeared to represent 'high/low liking *and* arousal potential-high/low liking *or* arousal potential'. This factor could be related in some way to the positive affect-negative affect version of the circumplex theory in which the pleasing and arousing dimensions are rotated through 45 degrees (see review by Larsen and Diener, 1992).

The specific emotions expressed by particular musical excerpts were also predictable in terms of meaningful combinations of liking and arousal potential. One-way ANOVAs for each emotion scale indicated that excerpts rated as being of high liking/low arousal potential (Quadrant 1) were also rated as the most 'relaxing' *and* the most 'peaceful'. Similarly, excerpts rated as being of high liking/high arousal potential (Quadrant 2) were also rated as the most 'exciting' *and* the most 'festive'. Excerpts rated as being of low liking/high arousal potential (Quadrant 3) were also rated as the most 'unsettling' *and* the most 'disconcerting'. Excerpts rated as being of low liking/low arousal potential (Quadrant 4) were also rated as the most 'boring' *and* the most 'unstimulating'. Note that the unexpectedly low number of excerpts located within Quadrant 1 means that the analysis of Quadrant 1 ratings must be interpreted with a degree of caution. Finally, a significant (although admittedly weak) inverted-U relationship maintained between liking and arousal potential, and this is consistent with Berlyne's research on *preference* for aesthetic objects.

These results indicate a direct link between the pleasing and arousing qualities of the musical excerpts and the specific emotions they expressed. The two sets of ratings had a great deal in common, and the nature of the relationship between them was predictable on the basis of Figure 3.2. More simply, the results show that both preferential and emotional aspects of responses to music seem to be predictable and explicable through two dimensions - 'like-dislike' and 'low arousal potential-high arousal potential'.

Although the present research did not attempt a direct test of the circumplex theory or Berlyne's theory, the nature of the relationship between the liking and arousal potential dimensions deserves further comment. The inverted-U relationship demonstrated here corresponds with research on Berlyne's theory. However, this relationship is discrepant with research on the circumplex theory which has consistently concluded that pleasantness and arousal are unrelated (see e.g. Russell, Ward, and Pratt, 1981).

However, the present results suggest a resolution of these two apparently disparate conclusions on the basis of the *curvi*linear (i.e. inverted-U) nature of the relationship between liking and arousal potential demonstrated here (and by other research on aesthetic stimuli). Two of the musical excerpts in the present study may have been liked equally but located on either the left- or right-hand side of the inverted-U: that is, they may have been sub- or super-optimally arousing to the same degree. Consequently, it is extremely difficult to assign a piece to a given quadrant of Figure 3.2 without knowing its degree of arousal potential. Similarly, although one of the present excerpts may have possessed a given degree of arousal potential, this does not in itself indicate the extent to which that excerpt should be liked. The inverted-U relationship between liking and arousal potential implies only that a piece of moderate arousal potential will be preferred over pieces of high or low arousal potential: liking may peak when pieces represent a moderate level of arousal potential, but even these moderately arousing pieces may still be ultimately disliked. For example, if the present study had employed exclusively brass band music (which the adolescent subjects would probably have disliked strongly), then the moderately arousing pieces would have been preferred to the less or more arousing pieces. However, the moderately arousing brass band pieces might still not have been liked sufficiently to be located within Quadrants 1 or 2. Consequently, it is extremely difficult to assign a piece to a given quadrant of Figure 3.2 without knowing the extent to which it is liked. This suggests that although ratings of liking and arousal potential assigned to the present stimuli may be related, *both* may mediate the emotions that the excerpts expressed: subjects' ratings of liking and arousal potential may not be independent of each other, but may still provide independently useful information in predicting the emotions expressed by the musical excerpts. The multiple regression and factor analyses above are consistent with this suggestion since they indicate that subjects' emotion ratings were associated with liking *and* arousal potential, rather than just one of these alone.

Since no previous research has taken such an approach, the present study raises several further issues for future investigation. Firstly, to what extent can the liking-arousal framework discussed here be applied to other emotions expressed by music and also responses to other artistic domains (e.g. painting) ? Second, since research has demonstrated the cross-cultural validity of the circumplex theory, future research might attempt to extend the present findings to the music of other cultures. Third, to what extent might a circumplex-type approach be able to accommodate the findings of other psychomusicological studies concerning the link between emotional response and arousal-mediating musical structural elements ? Fourth, to what extent would the

above findings generalise to music that has been experienced previously, and perhaps has specific memories associated with it ? Finally, to what extent can the model outlined above explain the emotions actually *experienced* by subjects in response to music rather than those simply expressed by the music ?

In summary, the present findings indicate that the emotions expressed by musical stimuli are associated closely with the pleasing and arousing qualities of those stimuli, and this allows us to link preferential with emotional responses to music. These two aspects of aesthetic responses to music are not and should not be treated as independent. The study perhaps also extends knowledge of affective processes by indicating more generally that affective responses to music can be explained in terms of the same dimensions that underlie responses to many other stimuli.

Chapter 4. The Effect of Stylistic Variation on Musical Preference

Whilst Chapter 3 attempted to apply Berlyne's theory to the domain of emotional responses to specific pieces of music, the studies reported here and in Chapter 5 both investigate responses to musical *styles*. Although some studies have investigated the development of responses to generic musical styles (e.g. Gardner, 1973; Hargreaves, Comber, and Colley, 1995; LeBlanc, Sims, Siivola, and Obert, 1993), most experimental research on aesthetic responses to music has considered responses to specific excerpts. However, research has yet to determine the relative importance of responses to pieces and styles as such. For example, when we hear a piece of music, to what extent do we respond directly to its specific melodic, choral or rhythmic features as distinct from more general characteristics such as its style or idiom ? The present chapter considers the relative extent to which liking for musical excerpts is determined by liking for the *style* and liking for the *piece* that the excerpt represents, and the following chapter considers how liking for musical styles may be related to their familiarity.

It should be noted here that in this study the term 'piece' is used to denote a given musical composition regardless of the style in which it is performed, whilst the term 'excerpt' is used to denote a musical extract derived from a specific piece x musical style combination. Subjects were presented with short musical excerpts taken from the original and from 'cover' versions of 5 well-known pieces by The Beatles: the large number of cover versions available meant that stimuli could be employed which represented a wide range of styles. This technique is considered further in the Discussion.

Each of the excerpts was rated for liking, and subjects also rated how much they liked each of the 5 pieces employed irrespective of the style they were recorded in, as well as how much they liked each of the musical styles they had heard irrespective of the pieces performed. In an attempt to determine which predominates, multiple regression and partial correlation analyses should indicate the relative importance of liking for the pieces and liking for the styles in governing liking for the given musical excerpts. Also, by virtue of their fame, responses to excerpts by The Beatles may be subject to factors other than those which govern responses to excerpts from the remaining musical styles: consequently, it would also be interesting to repeat the analyses whilst excluding excerpts by The Beatles so as to determine whether this changes the general pattern of results obtained.

Method

Subjects The 50 subjects (10 males, 40 females) were first-year psychology undergraduates with a mean age of 23.7 years (s.d. = 7.31, range = 18-44 years). To provide further information on the sample, a panel of three independent judges assessed a self-report of musical training and experience made by subjects, and determined that 23, 17, and 10 subjects possessed low, intermediate, and high levels respectively.

Musical stimuli Excerpts were selected from the original versions of 5 pieces that were written and performed by The Beatles (i.e. pop music). Comparable 'cover' versions of each of the 5 pieces were then identified in four other styles, and excerpts were also taken from these. The other musical styles were light orchestral, steel band, karaoke, and jazz. Each of the styles was represented by a single album containing the 5 pieces performed by a single artist/group. This meant that stylistic variations were minimally confounded by variations in the performing artist. Unfortunately, this criterion meant that it was only possible to identify a jazz excerpt for 4 of the 5 pieces. The Music Master Catalogue (1993) was used to verify that the artists were associated with their respective musical styles. Since excerpts from the 5 original recordings of the pieces were employed in conjunction with excerpts from the 19 cover versions, the experimental stimuli comprised a total of 24 commercially-released excerpts, with each representing a different piece x musical style combination. Full details of the pieces, performing artists, and source recordings may be found in Appendix 4.1.

A high quality master tape was prepared containing 45-second excerpts of the 24 stimuli. Each excerpt comprised the initial 45 seconds of the source recording from which it was taken, such that all the exemplars of a given piece contained the same portion of that piece. Each 45-second excerpt ended with a two second fade-out. Five random orders of the 24 excerpts were prepared from the master tape. Within each of these random orders, the 24 excerpts were conceptually divided into four sets of five excerpts and one set of four excerpts: a particular piece or style was not repeated within any given set. Across the 5 tape orders, each of the 24 excerpts appeared once in each of the 5 sets. This ensured that any given excerpt was presented at a different place in each of the 5 orders. On the basis of a small pilot study, a 10 second silent gap was recorded between excerpts to allow subjects time to mark their ratings.

Design Ten subjects were presented with each of the 5 excerpt orders. Each excerpt was rated on an 11-point Likert scale for liking, where 0 was defined as 'dislike very

much', 10 was defined as 'like very much', and 5 was defined as 'midway between the two'. After rating each excerpt, subjects were asked to circle which of the 5 musical styles they thought it represented. There were four occasions where subjects circled a style that did not correspond with that which the excerpt was intended to represent, and the four ratings of liking for the excerpt associated with these were not analysed further. At the end of each session, subjects rated their 'liking for each of the pieces, regardless of the styles they were recorded in', and also their 'liking for each of the styles, regardless of the pieces that were played in those styles'. Both these sets of ratings were given on the 11-point scale for liking described above. This technique is considered more fully in the Discussion.

Procedure Subjects were assembled in groups of 5, and were told that they would be hearing 5 excerpts of pieces performed by The Beatles along with 19 excerpts of these pieces recorded in other musical styles. The 5 pieces were then named by the experimenter, and subjects were asked to write the names of any pieces they did not know on the front of their response booklet as a check on the validity of ratings of liking for the pieces made at the end of the study. No subjects did this. It was then stressed that subjects should think carefully about the rating they would assign to each excerpt as it was playing. The 24 experimental excerpts were subsequently played and rated, with subjects also circling which of the 5 styles they thought each excerpt represented. Afterwards, subjects were asked to rate their liking for each of the pieces and each of the styles.

Results

Order effects A series of product-moment correlation coefficients was calculated between the mean liking ratings assigned to the excerpts for each excerpt ordering. The coefficients between the five excerpt orders ranged between +0.82 and +0.87 ($N = 24$, $p < 0.001$, in all cases). Mean ratings were also calculated within each excerpt ordering for ratings of 'Liking for the piece' and 'Liking for the style'. Product-moment correlations were calculated for each of these variables between the mean ratings assigned within the different orders. 'Liking for the piece' coefficients between the five excerpt orders ranged between +0.92 and +0.94; and 'Liking for the style' coefficients between the five excerpt orders ranged between +0.92 and +0.99 ($N = 5$, $p < 0.01$, in all cases). The possibility of order effects influencing subjects' ratings can therefore be ruled out.

Liking for pieces and liking for styles A multiple regression analysis was carried out to determine the extent to which ratings of liking for the styles and liking for the pieces regressed upon ratings of liking for excerpts. Both liking for the style (LS) and liking for the piece (LP) regressed significantly upon liking for the excerpt (LE), giving rise to respective T values of 27.85 and 6.98 ($p < 0.001$ in each case). The resulting regression equation, explaining 41.66% of the variance ($F = 424.95$, d.f. = 2, 1190, $p < 0.001$), is:

$$LE = -0.01 + 0.62\ LS + 0.23\ LP$$

This was further investigated by two partial correlation analyses of subjects' raw ratings (see Cooley and Lohnes, 1971; Darlington, 1968). The first calculated the correlation between liking for the style and liking for the excerpt, partialling out the effects of liking for the piece. The resulting coefficient was +0.63 (d.f. = 1190, $p < 0.001$). The second calculated the correlation between liking for the piece and liking for the excerpt, partialling out the effects of liking for the style. The resulting coefficient was +0.20 (d.f. = 1190, $p < 0.001$). A z' transformation test (see Edwards, 1960) was carried out on these two coefficients, with the resulting value of $z' = 13.12$ indicating that they differed at the $p < 0.01$ level. This result indicates that ratings of liking for the excerpt were associated more closely with liking for the style than with liking for the piece.

These analyses were then repeated with the exclusion of responses to excerpts performed by The Beatles, and this second set of analyses gave rise to an identical pattern of results to the first. Multiple regression showed that both liking for the style (LS) and liking for the piece (LP) regressed significantly upon liking for the excerpt (LE), giving rise to respective T values of 18.06 and 5.30 ($p < 0.001$ in each case). The resulting regression equation, explaining 29.06% of the variance ($F = 183.76$, d.f. = 2, 897, $p < 0.001$), is:

$$LE = -0.33 + 0.50\ LS + 0.20\ LP$$

This was further investigated by two partial correlation analyses of subjects' raw ratings, with responses to excerpts performed by The Beatles again being excluded. The first test calculated the correlation between liking for the style and liking for the excerpt, partialling out the effects of liking for the piece. The resulting coefficient was +0.52 (d.f. = 897, $p < 0.001$). The second test calculated the correlation between liking for the piece and liking for the excerpt, partialling out the effects of liking for the

style. The resulting coefficient was +0.17 (d.f. = 897, $p < 0.001$). A z^1 transformation test was carried out on these two coefficients, with the resulting value of $z^1 = 8.54$ indicating that they differed at the $p < 0.01$ level. This result indicates that ratings of liking for the excerpt were more closely associated with liking for the style than with liking for the piece. Whilst the effects obtained by this second set of analyses were generally weaker than those obtained when the analyses also considered the excerpts by The Beatles, they remain highly significant and in the same direction.

Discussion

The multiple regression analyses suggest that liking for the excerpts was more closely associated with liking for the styles than with liking for the pieces. Partial correlation analyses supported this conclusion: the correlation between liking for the excerpts and liking for the *styles* (controlling liking for the pieces) was significantly higher than was the correlation between liking for the excerpts and liking for the *pieces* when liking for the styles was controlled. In conjunction, these analyses indicate that responses to musical styles are a better predictor of liking for particular excerpts than are responses to pieces. This is interesting given that perhaps the majority of experimental research on musical preference has tended to consider responses to specific pieces: the present results suggest that it may also be important to consider responses to the musical style(s) from which those pieces are drawn.

The present study raises three methodological and theoretical issues which deserve further comment, and might limit the generality of the effects described here. One feature of the study was the assumption that liking for a given musical style could be assessed in terms of a single rating. Whilst this seems the most direct way of operationalising preference for such stimuli, there is a great deal of debate in the literature over what exactly constitutes a musical style (see e.g. Boretz, 1972; Brody, 1985; Nattiez, 1990; Nettl, 1964; Serafine, 1983, 1985). This debate makes it clear that the concept of 'musical style' is extremely complex, such that a simple measure of liking might fail to adequately capture subjects' preferences or indeed other variables that are salient in their responses to such stimuli.

A similar limitation may apply to subjects' ratings made at the end of the study of their liking for the pieces independent of the styles and their liking for the styles independent of the pieces. Given the lack of previous research from which the present methodology could be derived, this technique seems to be the most direct way of measuring subjects' impressions of one of these elements independently of their

impressions of the other, and the check for order effects indicated that subjects' ratings on these measures were reliable. However, the extent to which subjects can truly detach their liking for a style from their liking for a piece deserves further exploration.

Finally, it was necessary to employ stimuli which comprised the original and cover versions of a number of pieces: this was to control for variations between styles in the pieces presented to subjects, and music originally performed by The Beatles was employed so as to provide a sufficiently wide range of available cover versions. One implication of this is that the pieces employed were consequently so well established in British culture that the experimental stimuli may not generalise well to other musical pieces and styles: a wider range of stimuli may have altered the relative contributions of liking for the piece and liking for the style, and this is perhaps reflected in the weaker effects that obtained when the analyses above did not include excerpts performed by The Beatles. For this reason, it may be imprudent to generalise from the present results and assert that liking for a musical excerpt is *always* more closely associated with responses to the style than with responses to the piece. A more cautious conclusion is that these results show that musical style *is* an aspect of our responses to a given musical excerpt.

In conjunction, these three issues reiterate the need for an accurate definition of musical style since, in essence, they all concern the difficulties of reliably operationalising and measuring the effects of stylistic variations when it is not clear what a 'musical style' actually is. Also, the issues demonstrate that studying the effect of stylistic variations from an experimental perspective has inherent advantages (i.e. stimulus control) and disadvantages (i.e. operational definitions possibly leading to over-simplification of the problem). However, the main contribution of the research is in demonstrating that we should consider responses to the piece *and* the style when investigating musical preference, and that experimental techniques can be useful in this despite the difficulties they may inherently involve.

Chapter 5. Liking for Musical Styles and the Preference-Feedback Hypothesis

The previous chapter indicated that musical style may in its own right be associated with liking for a particular excerpt, and the research reported here extends this by investigating why a particular musical style might be liked more than another. Whilst several studies have investigated the factors underlying liking for musical styles from a developmental, social psychological, or sociological perspective (e.g. LeBlanc et al (1993), Chapman and Williams (1976), and Gans (1974) respectively), there have been few attempts to attribute differences in liking for styles to variables more closely related to the music itself. The present study considers one such variable, namely familiarity, and this is done in the context of the preference-feedback hypothesis which was described in Chapter 1. Indeed, the changing popularity of musical styles seems to be a clear example of the kind of cyclical vogues that the preference-feedback hypothesis attempts to explain.

As individuals, we all at times choose voluntarily to listen to pieces of music drawn from a particular style: however, the culture to which we belong also exposes us to musical styles involuntarily (e.g. through the media). Consequently, musical styles may fall into Class A or Class B of the preference-feedback hypothesis, according to the type of exposure through which they are experienced. They may be classified as Class A when exposure to them is voluntary, and as Class B when exposure to them is involuntary. The present study investigates the application of the preference-feedback hypothesis to liking for musical styles by obtaining 'liking' and 'familiarity' ratings for 30 musical styles. Two aspects of 'familiarity' are rated, corresponding with voluntary and involuntary exposure to the styles. The preference-feedback hypothesis predicts that a positive, monotonic relationship should hold between ratings of 'liking' and the degree to which the 30 styles are rated as being familiar to subjects personally ('personal familiarity'), since this exposure is under voluntary control (Class A). In contrast, an inverted-U relationship should hold between subjects' ratings of 'liking' and their ratings of the prevalence of the 30 styles in British culture ('general cultural familiarity'), since this exposure is beyond direct personal control (Class B).

Method

Subjects From a larger pool of volunteers, 64 subjects (13 males, 51 females) from a further education college in the East Midlands region of the U.K. were randomly selected for the study, and equal numbers were then randomly assigned to either a 'Liking' or a 'Familiarity' group. Mean age was 17.9 years (s.d. = 1.21, range = 16-22

years). To provide further information on the sample, subjects were asked to complete a self-report measure concerning their level of musical training and experience: on the basis of this, a panel of three independent judges determined that 28, 21, and 15 subjects possessed low, intermediate, and high levels respectively.

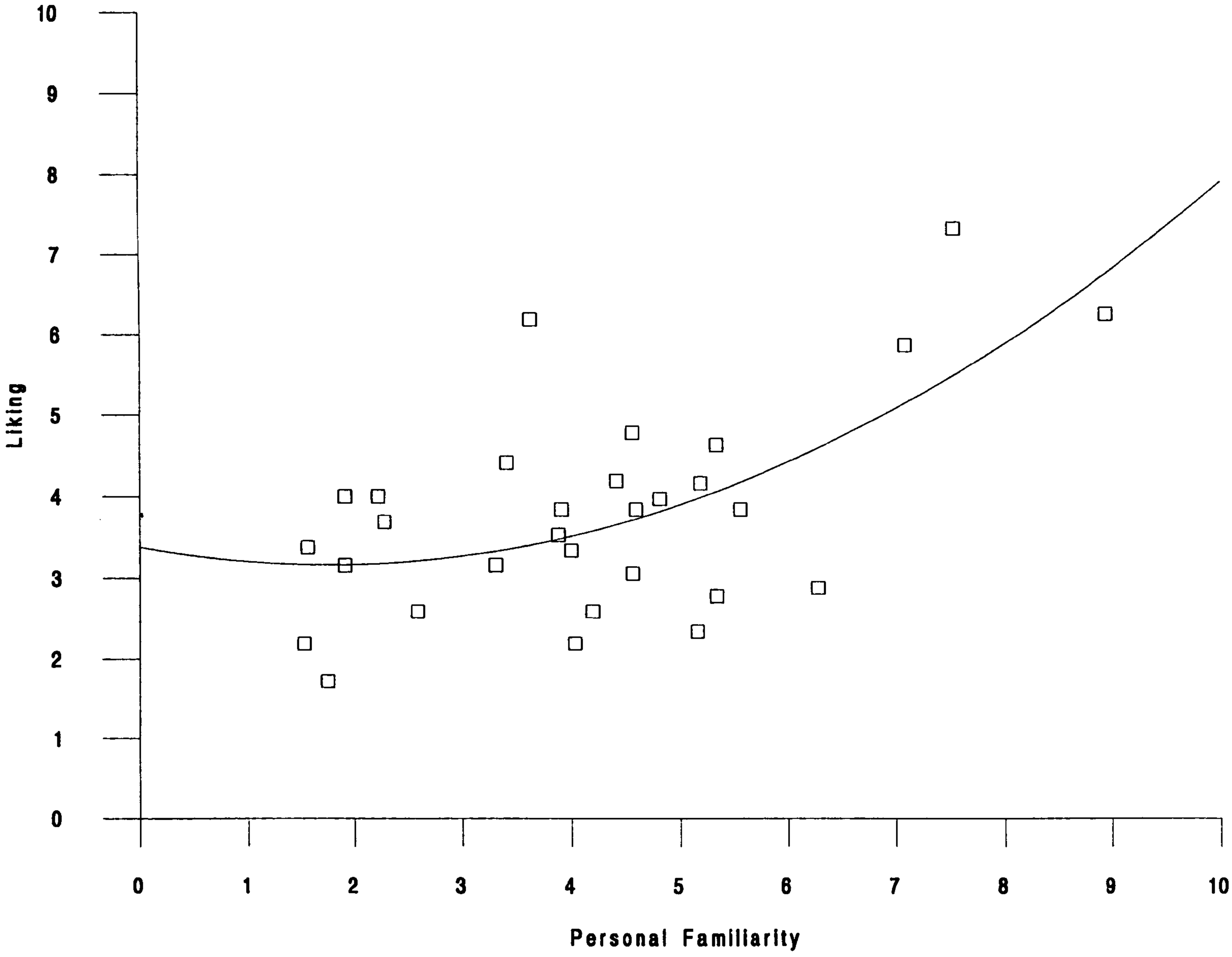
Experimental stimuli Musical styles were selected, predominantly from the Music Master Catalogue (1993), according to three criteria; that they should represent music from a wide span of years; be readily identifiable and distinguishable by subjects; and have been/currently be a part of British musical culture. 30 musical styles were subsequently selected. A 30 second representative excerpt was selected from each style to serve as a reminder to subjects. These excerpts were taken from the recordings of artists commonly associated with that style, and were recorded onto audio tape with a 15 second gap between each to allow subjects time to mark their ratings. Instructions to subjects emphasised that these excerpts were only a reminder of each style, and that ratings should not be based on the excerpt itself. Although such a technique introduced the risk that subjects might still respond to the particular excerpt rather than the style it was held to exemplify, it was thought that playing specific musical excerpts was perhaps the best way to ensure that the stylistic labels were understood reliably by the subjects. Details of the styles and representative excerpts may be found in Appendix 5.1.

Design and procedure Subjects were tested in two groups, seated in large classrooms within their college. The exemplar excerpts were presented, with each style being rated immediately after its exemplar excerpt. The 'Liking' group rated how much they liked each style, whilst the 'Familiarity' group rated each style for two aspects of familiarity, corresponding to voluntary and involuntary exposure respectively; how familiar the style was to each subject personally ('personal familiarity'), and the prevalence of the style in British culture ('general cultural familiarity'). These ratings were given on 11-point scales where 0 represented 'not at all', and 10 represented 'very much' for liking ratings and 'very' for the familiarity ratings. Subjects were instructed to not give a rating if they did not know the style in question, although in practice none did this.

Results

Figure 5.1 shows the scatter diagram of the relationship between mean liking and mean personal familiarity ratings over the 30 musical styles. Curvilinear regression analysis indicated that the data is better fitted to a quadratic model than a linear model

Figure 5.1 - The Relationship Between Liking and Personal Familiarity Ratings for 30 Musical Styles



($R^2 = 0.38$, $F = 8.14$, d.f. = 27, $p = 0.002$; and $R^2 = 0.32$, $F = 13.22$, d.f. = 28, $p = 0.001$ respectively). The regression equation for the quadratic model is $Y = 3.38 - 0.25X + 0.07X^2$, and this is plotted in Figure 5.1. Although statistically better fitted to a quadratic function however, perhaps the most salient feature of this relationship is that liking for the musical styles generally increased with their personal familiarity, with the most liked styles receiving the highest personal familiarity ratings, and the least liked styles receiving the lowest personal familiarity ratings. As such, this provides some tentative evidence in support of the prediction of the preference-feedback hypothesis regarding voluntary (Class A) exposure.

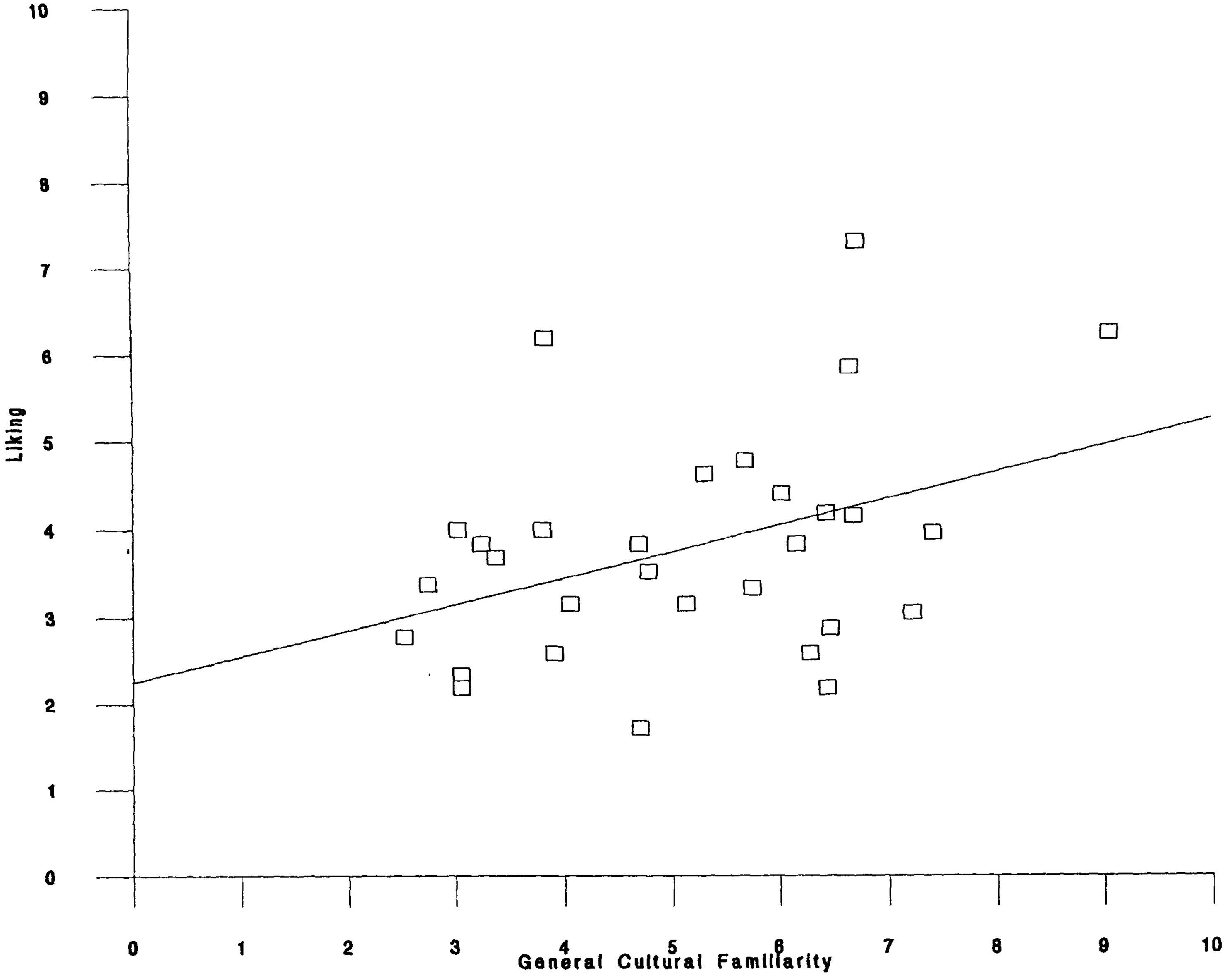
Figure 5.2 shows the scatter diagram between mean liking and mean general cultural familiarity ratings for the 30 musical styles. Curvilinear regression analysis indicated that the data were significantly fitted to a linear model ($R^2 = 0.15$, $F = 4.85$, d.f. = 28, $p = 0.04$), whilst the fit to a quadratic model did not reach significance ($R^2 = 0.17$, $F = 2.82$, d.f. = 27, $p = 0.08$), and this fails to support the prediction of the preference-feedback hypothesis for involuntary (Class B) exposure. The regression equation for the linear model was $Y = 2.25 + 0.30X$, and this is plotted in Figure 5.2.

Discussion

The results regarding the relationship between ratings of liking and voluntary (Class A) exposure provided some tentative support for the prediction of the preference-feedback hypothesis, consistent with Colman, Best and Austen (1986). The general nature of the relationship evident in Figure 5.1 suggests that liking for musical styles increases with their degree of personal familiarity. The hypothesised inverted-U relationship between liking and involuntary exposure to the musical styles was not confirmed.

There are at least three possible explanations for this latter result. The first is that by obtaining measures of personal familiarity and general cultural familiarity within subjects, ratings of the one might have in some way contaminated ratings of the other. A second explanation concerns a further development of the preference-feedback hypothesis to account for the interaction between familiarity with Class B stimuli and their characteristic degree of complexity. Berlyne's theory states that increasing familiarity should reduce the extent to which a musical stimulus is subjectively complex (and therefore arousing) because the listener receives more information regarding that stimulus. This means that if a given musical style is sub-optimally complex (i.e. too simple and unarousing), then increasing familiarity should bring

Figure 5.2 - The Relationship Between Mean Liking And Mean 'Cultural Familiarity' For 30 Musical Styles



about a further decrease in the level of arousal it evokes and further reduce liking. This should cause a negative relationship between liking and familiarity. Similarly, if a given musical style is super-optimally complex (i.e. too arousing) then it might have to become extremely familiar before evoking a sub-optimal disliked level of arousal. This should cause a positive relationship between liking and the familiarity of Class B stimuli. In short, increasing familiarity may have different effects on liking for different styles (cf. Hargreaves (1984) and Heyduk (1975) on liking for specific pieces).

In the context of the data reported here, it seems reasonable to suggest that the level of complexity which is characteristic of particular styles could have confounded the relationship between subjects' ratings of liking and general cultural familiarity. For example, the melodic variations that are characteristic of jazz mean that it is perhaps more complex than new age music: this might cause liking for these two styles to exhibit completely different relationships with familiarity (i.e. liking for jazz should peak at a higher level of familiarity). A possible consequence of this is that the hypothetical inverted-U relationship between liking and general cultural familiarity might break down.

A third possible explanation is simply that the preference-feedback hypothesis does not explain preference resulting from involuntary exposure to musical styles. Indeed, the generally positive relationships between liking and *both* measures of familiarity would seem to support Zajonc's (1968) well-known mere exposure hypothesis, the notion that 'mere repeated exposure of the individual to a stimulus is a sufficient condition for the enhancement of attitude toward it' (p. 1). Whilst it is impossible to make any definite interpretation of the present results on such *post priori* grounds, this third explanation is rather unattractive since the mere exposure hypothesis is unable to explain why several studies should demonstrate that liking for a stimulus can decrease with exposure to it (e.g. Berlyne, 1970; Cantor, 1968; Cantor and Kubose, 1969; Faw and Pien, 1971).

Given the rather equivocal findings here concerning familiarity, it is perhaps worth mentioning three further possible approaches that may explain responses to musical styles. First, it would be interesting to investigate the interaction between familiarity and the levels of complexity that are characteristic of particular musical styles. Increasing familiarity may have different effects on liking for different styles. Second, on the basis of the preference for prototypes model, it is possible that liking for musical styles might vary between particular pieces. In short, we may prefer that

musical style which is most typically associated with the musical piece in question (e.g. a rock song played with a rock rather than a jazz arrangement, or a jazz piece played with a jazz rather than a rock arrangement). Finally, it is possible that liking for musical styles may be associated with social and developmental psychological factors (cf. Chapters 17 and 22), such that existing theories of experimental aesthetics are unable to provide a complete explanation.

In conclusion, the effects of voluntary (Class A) exposure on liking for musical styles were generally consistent with the prediction of the preference-feedback hypothesis: data concerning the relationship between liking and involuntary (Class B) exposure did not support the hypothesis. However, given the wide range of music employed in the present study, it is encouraging that familiarity does appear to be useful in explaining liking for musical styles.

Chapter 6. Subjective Complexity, Prototypicality, and Liking for Pop Music

Whilst Chapter 3 attempted to extend Berlyne's theory into the domain of specific emotional responses, and Chapters 4 and 5 investigated musical styles, the study described here deals with two other possible means of increasing the scope of previous research on experimental aesthetics. These concern two aspects of Berlyne's theory, namely the relative importance of arousal-mediating variables and prototypicality, and the effect of musical training on preference.

As described in Chapter 1, several studies have investigated the relative importance of prototypicality and arousal-mediating variables (usually complexity) in explaining preference. The consistent conclusion of this research has been that the former is more important when dealing with naturalistic aesthetic stimuli such as commercially-released pieces of music (as distinct from e.g. computer-generated tonal sequences). Moreover, these studies have often failed to support the proposed relationship between preference and the arousal-evoking qualities of the stimuli. For example, Martindale and Moore (1989) found that typicality was related more closely to preference for excerpts of classical music than was complexity, with the former explaining 51% of the variance in preference, and complexity explaining only 4%. However, with the exception of this study, research on the relative importance of typicality and the arousal-mediating variables has neglected musical stimuli, and the present research investigated this issue in the context of responses to pop music. In addition to this, the present study allowed an investigation into the relationship between complexity and prototypicality. Previous research has not addressed the possibility of such a relationship, and this deserves to be studied.

A second feature of Berlyne's theory investigated here concerns the effects of musical training and experience on musical preference. Although the literature on this presents a rather equivocal picture, one of the clearer findings to emerge is that increased levels of musical training are associated with a growing preference for more complicated music. For example, Rubin-Rabson (1940) found that musical training was correlated positively with preference for 'modern' music; and Fay and Middleton (1941) found that subjects who preferred 'swing' music were of a lower level of musical ability than those who preferred classical music. Similarly, Hargreaves, Messerschmidt, and Rubert (1980) found that musically trained subjects gave higher preference ratings than untrained subjects, but also that this effect interacted with musical style such that it was more pronounced for classical than pop music excerpts.

Berlyne's theory provides one possible means of explaining why this might be so. The theory predicts that repeated exposure to a stimulus over time should lead to a reduction in the perceived complexity of that stimulus. In essence, through repeated exposure the brain habituates to musical stimuli: complex music that seems arousing to musically untrained listeners should be comparatively less arousing for the musically trained. This means that to obtain an optimal level of arousal from music, a musically experienced listener must hear pieces with greater arousal-evoking qualities than must an untrained listener. More simply, the inverted-U relationship between ratings of liking and complexity assigned by musically-trained people should peak to the right of that for untrained people. It should be noted however that this hypothesis depends on the assumption that subjects' complexity ratings reflect, to at least some extent, the *objective* informational properties of the pieces in question: the implications of this assumption are dealt with in the Discussion section.

To investigate these issues further, subjects rated 60 pop music excerpts for liking, complexity, and the extent to which they were typical of those that the subjects usually listened to themselves. Several hypotheses may be formulated concerning the nature of these ratings. First, there should be an inverted-U relationship between ratings of liking and complexity in support of Berlyne's theory, and optimal levels of musical complexity should be located further to the right of the complexity axis as subjects' level of musical training increases. Second, a positive monotonic or U-shaped relationship should maintain between ratings of liking and prototypicality in support of the preference for prototypes model. Third, previous research reviewed in Chapter 1 suggests that variations in stimulus prototypicality should explain more of the variance in liking than should variations in stimulus complexity. Finally, whilst it is difficult to predict the nature of the relationship between complexity and prototypicality with confidence, it is possible that if preference is positively related to prototypicality so there should be an inverted-U relationship between prototypicality and complexity when the latter is plotted on a horizontal axis.

Method

Subjects The subjects were 75 undergraduates (24 males and 51 females) with a mean age of 21.5 years (s.d. = 6.28, range 18-46 years). At the end of the study, subjects completed a self-report measure of musical training and experience which asked them to write a paragraph describing their 'most notable musical achievements (be these formal qualifications, playing in rock groups, or school music lessons etc.)'. Subjects were also encouraged to report the number of years for which they had been involved

with music. These self-reports were then assessed by a panel of three independent judges who were ignorant of the experimental hypotheses. The judges assigned 22 subjects to a low training group, 28 subjects to an intermediate training group, and 25 subjects to a high training group. These assignations were based on a discussion between the judges. Whilst this technique only allowed subjects to be assigned to musical training groups on a *post hoc* basis, it was thought preferable to a more *a priori* approach that recruited subjects for the study in terms of the number of grades they had passed on a traditional classical instrument: such an approach would have misrepresented the abilities of highly skilled pop and jazz musicians who may not have possessed such formal qualifications.

Design and musical excerpts 25 of the subjects rated the excerpts for liking, 25 for subjective complexity (defined as 'the extent to which each piece is unpredictable, erratic, and varied'), and 25 for prototypicality (defined as 'the extent to which each piece sounds like the music you normally listen to'). These ratings were assigned on 0-10 scales where 0 represented the low end and 10 represented an equally high rating. Each excerpt was rated immediately after its presentation. Approximately equal numbers of subjects from the 'low', 'intermediate', and 'high' training groups were represented within each condition, that is 8, 9, and 8 respectively in the liking condition; 7, 9, and 9 respectively in the subjective complexity condition; and 7, 10, and 8 respectively in the prototypicality condition.

The choice of musical excerpts was determined by four primary considerations: that they should all be representatives of a homogenous style or genre, thus minimising the possibility of subjects' biases influencing responses; that this style should possess face or ecological validity to the subject sample as exemplifying 'real' music; that the excerpts should represent a wide range of complexity within this style; and that none of the excerpts should have been heard previously by any of the subjects, so as to minimise the probability of ratings being influenced by external factors. To fulfil all of these criteria it was decided to employ excerpts of new age/ambient house music. This is a genre of modern popular music which was fashionable amongst the subject population (i.e. university students) at the time of the study. Recordings of this genre are readily identifiable as such, and have the great advantage of varying very widely in objective musical complexity.

39 of the 60 excerpts were selected from recordings of new age music listed in the Music Master Catalogue (1993), while 21 excerpts were selected from suitable recordings by other artists. 30 second non-vocal representative excerpts were copied

from the recordings onto audio tape. Three different random orderings of the 60 excerpts were recorded, and each of the three presentation orders of the music was played to equal numbers of subjects in each condition. The three orderings each began with three additional 'practice excerpts' for subjects. A 10 second gap was recorded between excerpts to allow subjects time to mark their rating. The names of the excerpts, the artists, and the style of music were withheld from subjects throughout. Titles from which the 60 experimental and three practice excerpts were selected are listed in Appendix 6.1.

Procedure Subjects were tested in a single session in groups of one to five: in each group they sat in an outward facing semicircle so as to effectively prevent non-verbal communication. The instructions at the top of the appropriate response sheet were read to them before they began to rate the excerpts, and these instructions included a request that subjects should circle any ratings assigned to pieces that they recognised: these ratings (28 in all) were subsequently discarded. The 3 practice excerpts were played and rated, followed by the 60 experimental excerpts. At the end of each session, subjects were also asked to rate their degree of attention to the excerpts on an 11-point Likert scale on which 5 represented a point mid-way between 'total attention' and 'complete lack of attention': if any subject had given an attention rating of below 5 (which none did), then his/her ratings would also have been discarded.

Results

To check for possible order effects in the data, product-moment correlations were computed between excerpt orders 1 and 2, 2 and 3, and 1 and 3. These analyses employed mean ratings assigned to each of the 60 excerpts, and were calculated for each of the three rating scales separately: the resulting values were +0.87, +0.71, and +0.79 respectively for liking; +0.90, +0.86, and +0.86 respectively for subjective complexity; and +0.85, +0.84, and +0.82 respectively for prototypicality. All of these coefficients were significant at the $p < 0.001$ level ($N = 60$ in all cases), which means that the possibility of order effects influencing the results can be ruled out.

Curvilinear regression analysis was carried out to investigate the degree of fit of both linear and quadratic functions to the relationship between mean ratings of liking and complexity assigned to the 60 excerpts. Both the linear and quadratic models showed a significant fit to the data ($F = 12.81$, d.f. $= 58$, $p = 0.001$; $F = 29.31$, d.f. $= 57$, $p < 0.001$ respectively), and the resulting values of R^2 indicate that these models explained 18.1% and 50.7% of the variance in these data respectively. Therefore, the liking-subjective

complexity relationship is best described as a quadratic function, with the regression equation of $Y = 1.69 + 1.59X - 0.19X^2$ indicating that this takes the form of an inverted-U (see Figure 6.1).

To investigate this relationship further, curvilinear regression analysis was carried out within each of the three musical training groups separately to investigate the fit of linear and quadratic functions to the relationship between mean ratings of liking and complexity assigned to the 60 excerpts. The results for the linear and quadratic models were $R^2 = 0.08$, $F = 5.19$, d.f. = 58, $p < 0.05$, and $R^2 = 0.33$, $F = 14.02$, d.f. = 57, $p < 0.001$ respectively in the low training group; $R^2 = 0.23$, $F = 16.95$, d.f. = 58, $p < 0.001$, and $R^2 = 0.46$, $F = 23.99$, d.f. = 57, $p < 0.001$ respectively in the intermediate training group; and $R^2 = 0.13$, $F = 8.51$, d.f. = 58, $p < 0.01$, and $R^2 = 0.42$, $F = 20.66$, d.f. = 57, $p < 0.001$ respectively in the high training group. Although all these analyses were significant, the values of R^2 indicate that the quadratic function was better fitted than the linear function in each of the three groups. The regression equations for the quadratic relationships are $Y = 2.10 + 1.48X - 0.17X^2$; $Y = 2.32 + 1.27X - 0.16X^2$; and $Y = 1.91 + 1.45X - 0.16X^2$ in the low, intermediate, and high musical training groups respectively. The equations indicate that the quadratic relationships take the form of an inverted-U within each group, and these functions are plotted in Figure 6.2.

These three curves support the predictions of Berlyne's theory in that the 'low training' group's curve peaks to the left (i.e. lower mean optimal complexity) of the other two curves, with the 'high' and 'intermediate training' groups' curves peaking at approximately the same point as one another (although the latter curve peaks slightly to the right of that for highly trained subjects). In other words, higher levels of training are associated with higher levels of preferred musical complexity.

Curvilinear regression analysis was carried out to investigate the degree of fit of both linear and quadratic functions to the relationship between mean prototypicality and liking ratings assigned to the 60 excerpts. Only the linear model showed a significant fit to the data ($F = 271.82$, d.f. = 58, $p < 0.001$), with the regression equation of $Y = 0.83 + 0.88X$ indicating that this relationship was positive (see Figure 6.3). The resulting value of R^2 indicates that this model explained 82.4% of the variance in these data.

A final curvilinear regression analysis was carried out to investigate the degree of fit of both linear and quadratic functions to the relationship between mean prototypicality and complexity ratings assigned to the 60 excerpts. Both the linear and quadratic models showed a significant fit to the data ($F = 19.91$, d.f. = 58, $p < 0.001$; and $F = 23.42$, d.f. =

Figure 6.1 - The Relationship Between Mean Liking and Subjective Complexity Ratings

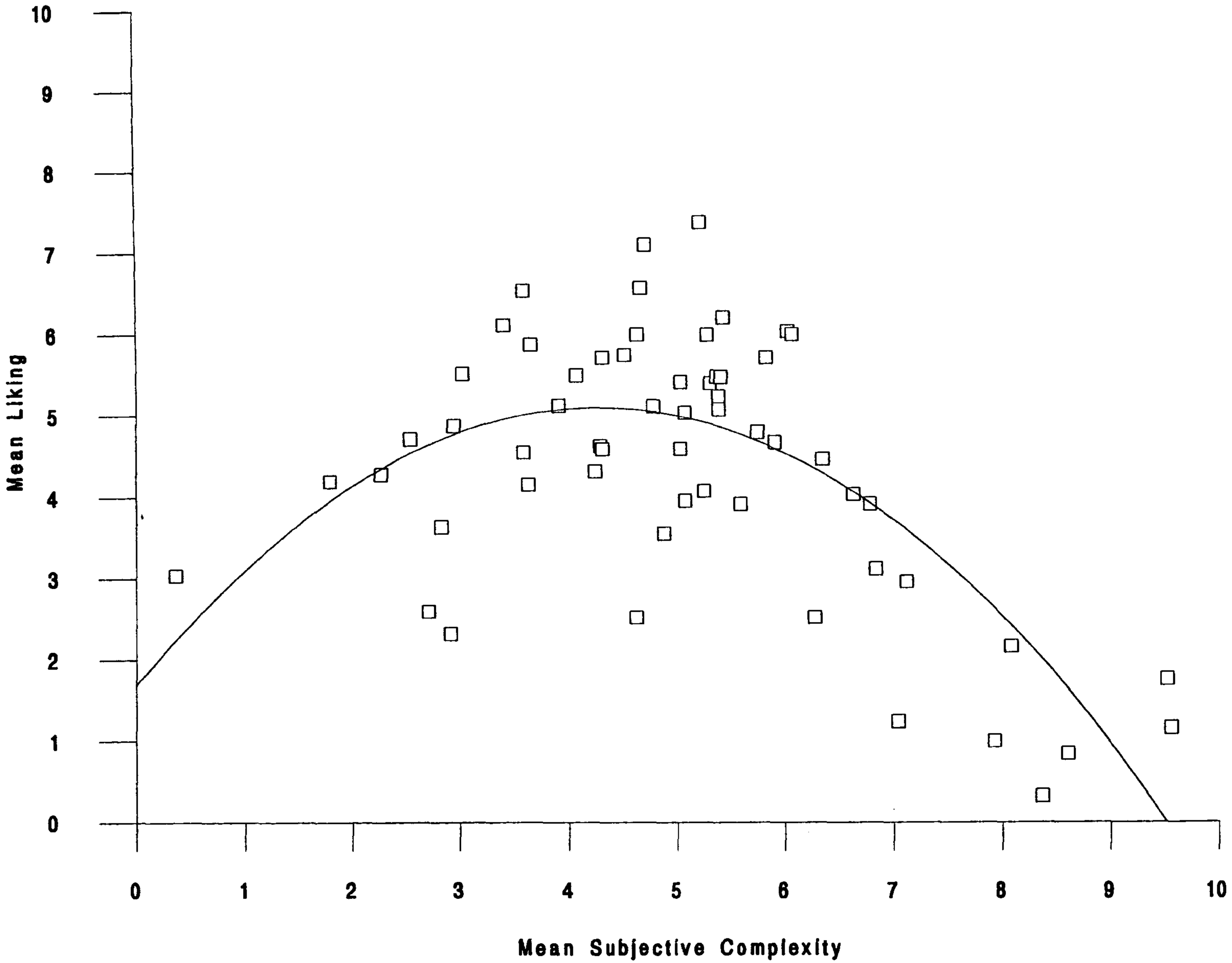


Figure 6.2 - Liking and Subjective Complexity Ratings of the 'Low', 'Intermediate', and 'High' Musical Training Groups

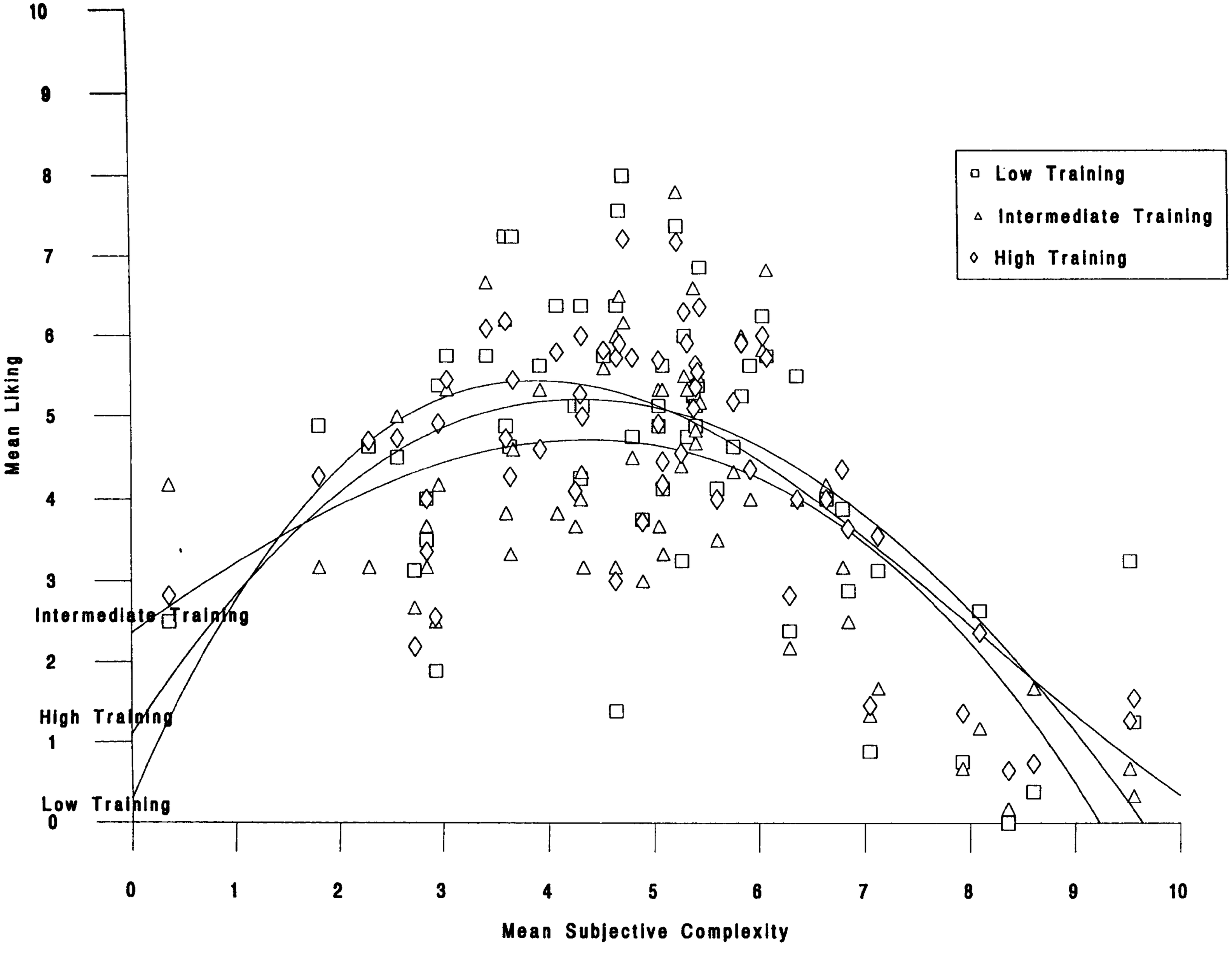
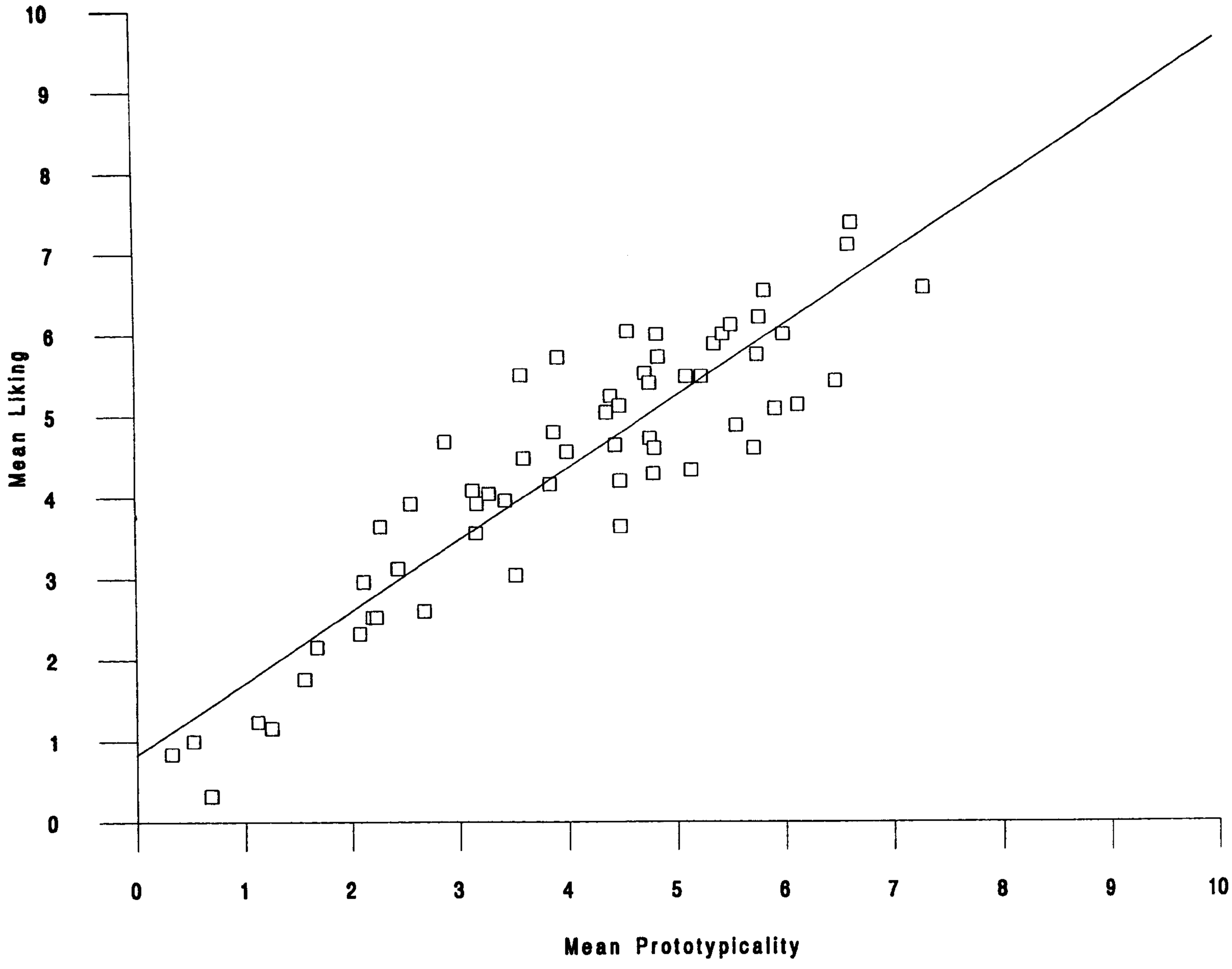


Figure 6.3 - The Relationship Between Mean Liking and Prototypicality Ratings



57, $p < 0.001$ respectively), and the resulting values of R^2 indicate that the models explained 25.6% and 45.1% of the variance in these data respectively. Therefore, the prototypicality-subjective complexity relationship is best described as a quadratic function, with the regression equation of $Y = 2.69 + 1.11X - 0.15X^2$ indicating that this takes the form of an inverted-U (see Figure 6.4).

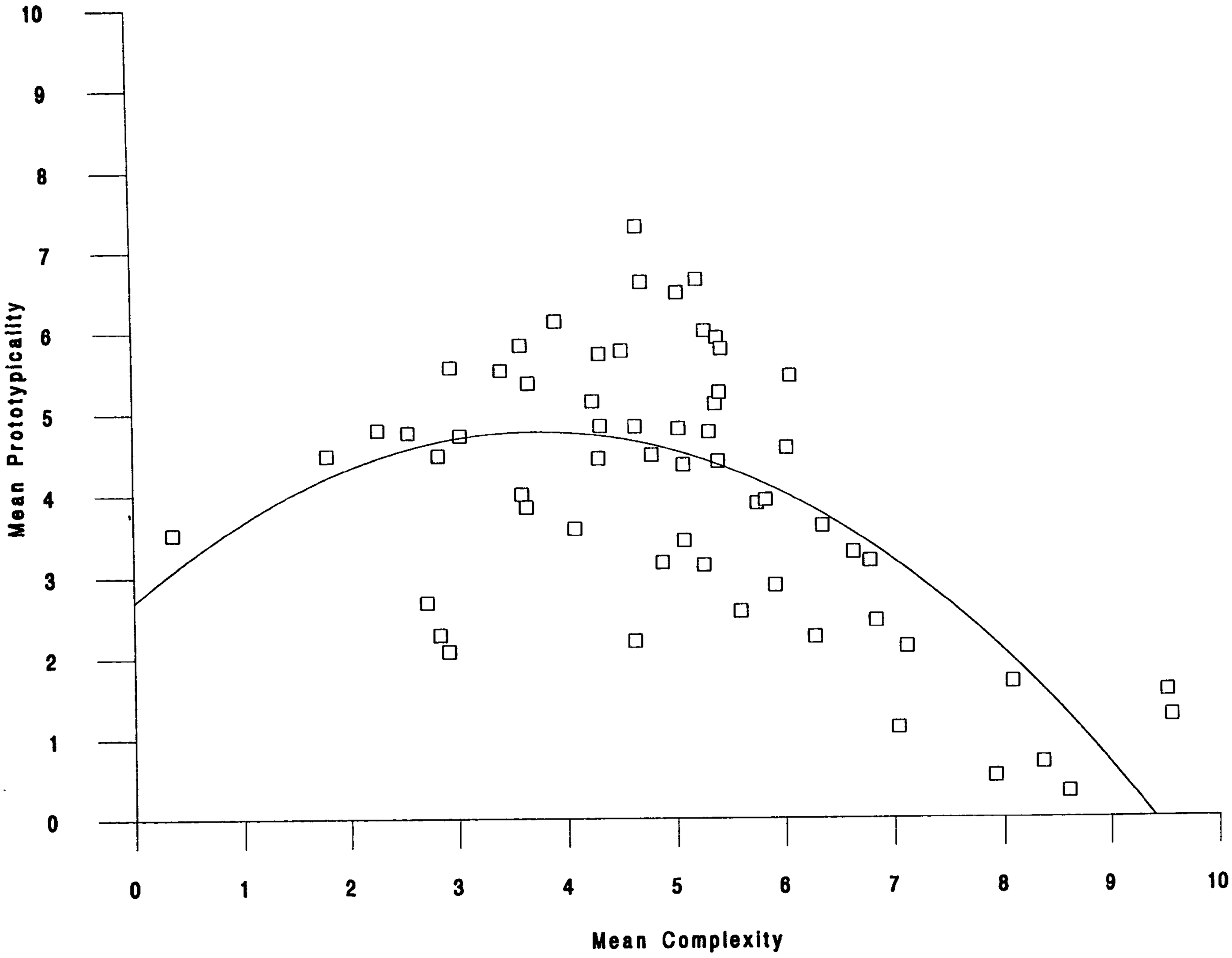
Discussion

The results support the predictions of Berlyne's theory since there was an inverted-U relationship between ratings of liking and complexity. Moreover, an analysis of the same relationship within three sub-groups comprising subjects with different levels of musical training indicated generally that higher levels of musical training are associated with higher optimal levels of complexity (although the inverted-U curves for the 'high' and 'intermediate' musical training groups appear to peak at a similar level of complexity). The results also support the predictions of the preference for prototypes model since there was a positive relationship between liking for the excerpts and the extent to which they were typical of the music that subjects' usually listened to. The linear relationship between these two variables explained more of the variance in these data (82.4%) than did the inverted-U relationship between liking and complexity (50.7%). This suggests that musical preference is related more closely to prototypicality than complexity, and as such corresponds with earlier research concerning the relative importance of typicality and arousal-mediating variables (see Chapter 1).

However, one caveat must be added to this latter conclusion. Whilst musical preference was related more closely to typicality than complexity, the extent of this difference was smaller than has been demonstrated in previous research. Earlier studies have shown that the proportion of variance in preference for 'real' stimuli accounted for by complexity has been negligible (see Chapter 1): however, in the present study complexity explained 50.7% of subjects' preferences for real aesthetic stimuli, and this was statistically significant. The importance of typicality and the arousal-mediating variables may not differ as much as previous studies have suggested, and it is interesting to go beyond the present data and discuss the theoretical reasons why this might be.

One possibility is that the relative importance of the two variables is domain-specific, such that the gap between them is smaller for music than for the stimuli investigated in other studies: however, this cannot explain why Martindale and Moore (1989) found that complexity accounted for only 4% of the variance in subjects' preference for

Figure 6.4 - The Relationship Between Mean Prototypicality and Complexity Ratings



classical music. One other possible explanation concerns the range of stimuli employed. Consider a hypothetical experiment involving two stimulus sets. The first set varies considerably in the extent to which its members are typical of the music subjects experience usually, but not *at all* in the extent to which its members are complex. In the second set of stimuli, the members vary considerably in complexity but not *at all* in the extent to which they are typical of the music subjects experience usually. In the first set of stimuli, complexity could not explain any variance in preference between the different members, whilst prototypicality would explain much more. In the second set of stimuli however, prototypicality could not explain any variance in preference between the different members, whilst complexity would explain much more: if the members of a set of stimuli do not vary at all in terms of a given factor, then it is *impossible* for this factor to explain variations in preference.

Such a pattern of results would suggest that the influence of complexity and prototypicality on preference might be, at least partly, proportional to the extent to which the stimuli represented variations in these factors in the first place: the more that stimuli vary in complexity, so the more scope there is for complexity to explain variations in preference. In light of this we might expect that when stimuli are deliberately selected so that they seem to represent a range of complexity as well as prototypicality, then these two variables might be much more evenly matched as correlates of musical preference. This is perhaps what occurred in the present study. In essence, any attempt to investigate the relative importance of typicality and arousal-mediating variables may obtain results that reflect not only the differential importance of the variables, but also the extent to which the specific stimuli employed varied in terms of these variables.

Indeed, an attempt was made to test this notion by deriving the two hypothetical stimulus sets discussed above. However the task was impossible, and the reasons for this cast further light on earlier research on the importance of prototypicality. Variations in any variable are by definition variations in the extent to which those musical pieces are typical of those to which subjects are exposed usually: for example, we are more typically exposed to music of one given level of complexity than another, and so a variation in complexity also represents a variation in prototypicality. The same difficulty would arise in an attempt to investigate the relative importance of typicality and the number of times the word 'dog' was mentioned in the lyric of several songs. We are most typically exposed to songs that have the word 'dog' in the lyric a given number of times, and so variations in even this absurd variable would also constitute variations in the prototypicality of the music. In short, it is impossible to hold prototypicality

constant whilst manipulating other variables since the manipulation of *any* other variable will also affect the degree to which the stimulus approximates to the music that subjects are exposed to typically.

This has three implications. First, if manipulating any stimulus variable also influences stimulus prototypicality, then all that prototypicality effects really constitute are the effects on preference of *all* the ways in which a stimulus differs from others. There is no such thing as a variation in solely stimulus prototypicality: there are only variations in the factors that constitute stimulus prototypicality. Consequently, it might be more informative to discuss any effects of typicality on preference in terms of the variable(s) that brought about variations in typicality. In short, the preference for prototypes model tells us that we like a given piece because it approximates to the music we have heard previously: it does *not* tell us why a given piece approximates to those we have heard previously or why we should have chosen to listen previously to certain specific pieces rather than others.

Secondly, it is even possible therefore that prototypicality effects may come about *at least in part* because of variations in the extent to which stimuli are arousing. Although the data reported in Figure 6.4 certainly do not prove such an argument, they are at least consistent with this: moderately complex music was most typical of that to which subjects listened usually. Whilst other factors are undoubtedly involved in prototypicality, the effects of this factor might be partly explicable in terms of variations in which the excerpts also possessed arousal-mediating qualities, and this contrasts with earlier studies that have discussed the dissimilarities between the effect of these two variables on preference. It is worth noting that aside from the claims of the two theories considered in this chapter, there is no *a priori* reason to assume that musical preference should be determined exclusively by *either* arousal- *or* cognitive-based processes. Perhaps instead the two approaches are linked closely, such that they operate simultaneously.

Finally, if prototypicality is a 'catch-all' factor which involves elements of all those variables that mediate preference, then it must therefore explain more of preference ratings than other variables in isolation from one another. For example, since prototypicality encompasses variance in complexity in addition to other relevant variables, it must logically explain more of preference than a measure of complexity alone. As such, the greater extent to which preference can be explained by prototypicality rather than other variables is much less impressive.

However, whilst the preference for prototypes model may tell us little about the specific variables that mediate preference, it still provides an extremely robust causal mechanism through which these variables may have such an effect. Berlyne's theory is limited in that it cannot explain variations in preference attributable to factors other than arousal: for example, why should we prefer Beethoven's 9th Symphony to a mild electric shock, since both would induce a moderate level of arousal ? In contrast, by taking a cognitive network approach, the preference for prototypes model can explain why subjects respond as they do as the result of *all* the features of a particular stimulus: the model allows an aggregation of all the influences on musical preference no matter how apparently disparate they are. More simply, if prototypicality is the sum of all preference-mediating variables, then the effects of any variable on preference can be explained in terms of the preference for prototypes model and its category activation framework.

Before concluding it is worth commenting on an alternative explanation of the data presented in Figure 6.2 concerning the effect of musical training on preferred levels of musical complexity. This alternative explanation suggests that the effects obtained here may not be as consistent with Berlyne's theory as first appears, and rests on the distinction between *objective* complexity (i.e. the measurable informational properties of the music itself) and *subjective* complexity (i.e. subjects' perception of the informational properties of the music).

It is possible that subjects' ratings of complexity reflected relatively little of the ***objective*** properties of the pieces in question, and more of the participants own ***subjective*** experiences of the music. If this is so, then when musically trained subjects assign a complexity rating of e.g. 5 then this might actually refer to a higher level of objective complexity than musically-untrained subjects' ratings of 5: the former group are more habituated to processing musical stimuli, and so pieces that seem moderately complex to them will actually be *more* objectively complex than pieces which seem moderately complex to subjects with less musical experience (and who are therefore less habituated to processing musical stimuli). In short, the subjects are referring to different levels of *objective* complexity, but still assign the same moderate rating on the basis of their *subjective* perceptions. If both groups prefer music that seems moderately complex to the subjects personally, as Berlyne's theory predicts, then both should produce liking-complexity relationships that peak at the same point of the complexity axis. In contrast, the data presented in Figure 6.2 shows that the curve for musically-untrained subjects peaks to the *left* of that for the musically-trained, and therefore might

not be consistent with Berlyne's theory. Future research could investigate the validity of this argument by employing objective as well as subjective measures of complexity.

In conclusion, this study has provided empirical support for Berlyne's theory, and extends this theory by suggesting that it may explain the effects of musical training on preference. The results also support the preference for prototypes model, and conform generally with previous research on the relative strength of the relationship of preference to prototypicality and the arousal-mediating variables. However, there are also grounds for arguing that the apparently greater importance of prototypicality may be at least partly a consequence of the stimuli in question, and that prototypicality is perhaps more useful as a theoretical construct which aggregates the determinants of preference than as a specific variable in its own right. The research discussed in Part B of the thesis considers prototypicality in this light.

More generally, this part of the thesis has shown that the theories and techniques of experimental aesthetics might be extended to investigations of the emotions expressed by music, and also liking for musical styles. If future research could advance these lines of inquiry then they might constitute an interesting adjunct to the existing literature which employs experimental approaches in attempting to explain usually *liking* for *individual* pieces of music. This part of the thesis has also provided some evidence on how apparently conflicting theories of affective response might be reconciled. In particular, Chapter 3 suggests a means by which the circumplex theory might be related to Berlyne's theory, and the present chapter suggests that arousal- and cognitive-based explanations of musical preference might not be so discrepant as earlier research has tended to suggest. As research in this field is replete with theories that claim to explain subjects' responses in their entirety, it might indeed be sensible to attempt to determine some form of common ground between these different approaches.

However, whilst the research reported so far has led to some interesting conclusions, it could be made much more relevant to most people's musical experiences if it took account of the context of music listening. In effect, the studies in this part of the thesis assume that aesthetic responses are made without reference to anything other than musical stimuli, as though they were independent of the real world in which people actually experience music. Parts B-D address this by directly investigating the role of the listening context.

Part B. Listening Situations

Chapter 7. Listening Situations

'The occasional experiment in the psychology of music is even today being carried on under conditions so artificial that the findings bear little relation to the affairs of real life' P. R. Farnsworth (1948, p. 50-51)

Although published in 1948, Paul Farnsworth's understated words are as true today as they were nearly 50 years ago. Part B the thesis, which this Chapter introduces, addresses Farnsworth's criticism in considering how music might be related to 'the affairs of real life'. In short, what can theories derived in the laboratory tell us about how we listen to music in real-life situations ? This issue is investigated by means of naturalistic tests of theories of musical preference (Chapters 8 and 9), the influence of the environment on musical behaviour (Chapters 10 and 11), and the influence of music on environmental behaviour (Chapters 12, 13, and 14). The main feature of these chapters is the relationship between aspects of the environment and aspects of the music described in terms of variables derived from research on experimental aesthetics.

Although used frequently, the very definition of the term 'experimental aesthetics' raises important issues. Firstly, what does the word 'experimental' imply ? It certainly indicates many of the qualities that behavioural science ought to satisfy, such as laboratory-based studies which control extraneous variables and manipulate other factors. However, as some have argued, this approach may only be of limited use (see e.g. Konecni, 1982; Persson and Robson, 1995). If a theory is to explain behaviour in its entirety then it goes without saying that research based solely in a laboratory cannot do so. At some point, research must be carried out under real world conditions, focusing on the mundane, everyday circumstances of music listening. A theory of musical preference must ultimately explain why a driver taps his/her fingers on the car steering wheel in time to a particular song on the radio as well as simply why a first-year psychology undergraduate assigns a preference rating of 4 to a certain 10 second duration computer-generated monophonic tone sequence.

Secondly, what does the term 'aesthetic' response to music imply ? When music critics and musicologists discuss the term they often seem to be considering a form of peak experience involving a profound affective response to a great or famous piece. However, psychologists cannot justify investigating *only* these peak experiences because it is impossible to define a borderline between them and more everyday responses to music. Moreover, mundane 'tapping-on-the-steering-wheel' responses to

music are more common than peak musical experiences: if they were not then scrap yards would be full of the vehicles wrecked by drivers who have been intoxicated by the music on their in-car stereos ! Given their apparently high prevalence, mundane everyday responses to music should perhaps be given much more research attention.

However, a frequent criticism of much of the research on experimental aesthetics and particularly Berlyne's theory concerns a general lack of ecological validity (see Hargreaves, 1986; Konecni, 1982). Kellaris (1992) supported Berlyne's theory in finding an inverted-U relationship between the tempo of music played at American-Greek social events (e.g. weddings) and the duration of subsequent applause. However, many studies have employed at least one or more elements of a typical and much less naturalistic methodology in which specially prepared musical stimuli are presented under laboratory conditions to university undergraduates, school pupils or musicians. Although Berlyne strongly advocated this 'new experimental aesthetics', emphasising the use of precise experimental methods, subsequent research has tended to neglect his second argument that equal emphasis should be placed on a more naturalistic approach. Berlyne (1974) notes that although it is more difficult to achieve experimental control within this latter approach, research to establish the ecological validity of his theory is 'ultimately unavoidable' (p. 20). 'Both approaches are necessary to experimental aesthetics' (Berlyne, 1974, p. 18).

The typical methodology described above may be questioned on three grounds, despite its considerable value as a means of investigating extremely complex phenomena. Firstly, people do not typically listen to artificial tonal or rhythmic sequences; rather they listen to what they would call *real* music. This differs markedly from laboratory-produced stimuli in terms of its general style and duration: laboratory-produced stimuli are not necessarily analogous to 'real' music. Secondly, people are not generally exposed to music under laboratory conditions. In the late 20th century, the occasions on which we sit down to specifically listen to music at home are greatly outnumbered by the occasions in which we are exposed to music as we perform other everyday tasks such as driving, shopping, or watching television. In essence music is part of our lifestyle, constituting usually one aspect of *other* activities, and little research has concerned this. Finally, people from a wide variety of backgrounds enjoy music, and the direct investigation of the general public's responses has been comparatively neglected. There is a great need for research that recognises these issues whilst maintaining empirical rigour. However, it should be stressed that these arguments do not question the value of conventional laboratory experiments, since these obviously remain the best means of generating rigorous theories: rather after

laboratory development, these theories should then be tested under naturalistic conditions, and such tests may in their own right allow the theories to be developed.

In support of arguments such as these, Konecni (1982) notes that the majority of research has 'treated aesthetic preference and choice as if they, and the process of appreciation itself, normally occur within a social, emotional, and cognitive vacuum, as if they were independent of the contexts in which people enjoy aesthetic stimuli in daily life' (p. 498). He suggests that 'What seems needed is a broader perspective on music appreciation, one that ... takes into account the reality of music appreciation in our time' (p. 499). Konecni (1982) particularly emphasised 'the penetration of music into every corner of people's lives' (p. 499). 'People listen to music while working, talking, eating, engaging in sexual intercourse ... What music does to people at different times, why they choose to listen to it so much, why they choose a particular type of music while engaged in a particular activity - all of these are important and unanswered questions' (p. 500).

Although the purpose of carrying out the studies in Part B of the thesis was to investigate how music forms a part of people's lifestyles, it is also worth noting a possible, more specific, educational implication of research on the relationship between music and the listening situation. The U.K. National Curriculum for Music (Department for Education, 1995) stipulates that by 14 years of age, children should be able to 'identify ways in which personal response is influenced by the environment', 'relate music to its social, ... and cultural context, ... *eg identify conventions used in different times and places*' (original emphasis), and 'identify how and why musical styles and traditions change ... from place to place' (p. 7). Research on the relationship between music and the listening environment should shed light on all these issues.

Music and consumer behaviour Outside the domain of mainstream psychology, several researchers have investigated everyday musical experiences from a marketing perspective (see review by North and Hargreaves, in press). Perhaps the best known studies have concerned the effects of in-store music on the speed of consumer activity, with the first and perhaps most theoretically-oriented of these being carried out by Smith and Curnow (1966). They played loud and soft music in a supermarket to test the 'arousal hypothesis' that a certain degree of noise will increase activity. On average, customers in the loud music condition spent less time in the supermarket (17.64 minutes) than in the soft music condition (18.53 minutes): arousing music made customers shop more quickly. Other studies have focused on musical tempo, demonstrating that fast as distinct from slow tempo music leads to shoppers moving

more quickly around a supermarket (Milliman, 1982); diners spending less time at their tables in a restaurant (Milliman, 1986); more bites per minute being taken in a university cafeteria (Roballey, McGreevy, and Rongo et al, 1985); and faster drinking in a bar (McElrea and Standing, 1992).

A small number of studies suggest that affective responses to music may mediate purchasing and affiliative behaviour. For example, Areni and Kim (1993) played classical music and Top 40 music in a wine cellar: although the two types of music did not influence the number of bottles of wine sold, classical music led to customers buying more expensive wine than did Top 40 music. Similarly, Alpert and Alpert (1990) found that sad music led to higher purchase intentions for greetings cards than did happy music. Dube, Chebat, and Morin (1995) manipulated the musical background of a video simulation of a bank, and found that musically-induced pleasure positively influenced consumers' desire to affiliate with bank employees (see also Baker, Levy, and Grewal, 1992). The pattern of findings indicated here supports the general contention of these studies that musically-induced affect leads to positive responses toward everyday commercial environments.

Several recent studies have also shown a relationship between music, time perception, and consumer behaviour (e.g. Ramos, 1993; Stratton, 1992; Yalch and Spangenberg, 1990). Wansink (1992) followed what seems a sensible line of thought in arguing that consumers would be expected to under-estimate time durations when they hear liked music. However, Kellaris has shown the opposite; in effect, time does *not* fly when you're having fun, since in his experiments disliked music led to shorter time estimates than liked music. These effects were explained in terms of the influence of musically-evoked affect on cognitive processing, such that disliked music leads to fewer events being encoded, and this in turn reduces the perception of elapsed time (see e.g. Kellaris and Altsech, 1992; Kellaris and Kent, 1992; Kellaris and Mantel, 1994; and also Chebat, Gelinas-Chebat, and Filiatrault, 1993).

Before concluding this section, it is also worth describing one fascinating study which suggests that music may affect consumers' everyday responses even when it is not present in the immediate environment. Zullow (1991) determined the top 40 selling songs in the U.S.A. for each year between 1955 and 1989, and measured their lyrics in terms of 'pessimistic rumination' (i.e. depressive content). Variations in pessimistic rumination predicted the U.S. Government's principal measure of consumer optimism, and this in turn predicted Gross National Product with a one to two year time lead, such that changes in the song lyrics preceded changes in the economy. More simply,

'Pessimistic rumination in popular songs ... predict(s) economic recession via decreased consumer optimism and spending' (p. 501). Moreover, Zullow concludes by noting that the very high levels of pessimistic rumination at the time of writing predicted an American recession in the early 1990s ! Although it would clearly be interesting to attempt to replicate these kind of findings (see also e.g. Stack and Gundlach, 1992), Zullow's study provides a dramatic demonstration that music may well be associated with aspects of people's everyday behaviour.

Experimental aesthetics and everyday listening situations The findings reviewed briefly above indicate that responses to music may interact with the mundane, everyday circumstances in which music is experienced. However, these marketing studies tend to be of limited psychological value in that they often concern very specific responses to very specific environments (e.g. number of wine bottles purchased), with little discussion of the wider psychological implications of the findings. Also, the studies may have underspecified the role of music in the environment by considering the relative effects of, for example, liked versus disliked music or fast versus slow music. As Chapter 1 has described, psychological theories have tended to conceptualise music in terms of different variables, such that it is not always easy to consider marketing studies of music in terms of these factors.

Despite the need for ecologically-valid psychological studies based on coherent theories, only a very small number have actually been conducted. In a series of complex and carefully controlled experiments in the late 1970s, Konecni extended Berlyne's theory in an investigation of the interaction between music and the arousal-mediating qualities of the listening environment. Konecni conceptualised the music listener as a mood and emotion-optimising organism, and specifically investigated the interaction between arousal evoked by an experimental situation and arousal evoked by features of the music (usually its complexity and/or volume). He proposed that these sources of arousal were linked by a feedback loop. In this, situationally- and musically-evoked arousal are summed by the listener so that musical selections should indicate an attempt to optimise arousal evoked by the listening context as a whole. For example, in a highly arousing situation listeners should choose to listen to simple (i.e. uncomplex) music that should reduce their level of arousal. Also, subsequent responses to the listening situation should mediate this effect. For example, after environmental stimulation, subjects who have the opportunity to 'let off steam' by performing arousal-reducing actions should enjoy moderately arousing music: subjects who have not been able to reduce situationally-evoked arousal through these means should continue to prefer relatively simple music. In short, people are 'engaged

in a constant exchange with the social and nonsocial environment, of which the acoustic stimuli are a part' (Konecni, 1982, p. 501).

Konecni, Crozier, and Doob (1976) report a typical experiment within this approach which had three main sections. In the first, the experimental group of subjects were insulted repeatedly by a confederate of the experimenters posing as a subject: pilot work had already established that this would bring about a high degree of arousal in subjects. In a separate part of the study, subjects chose to listen to short melodies of either high or low complexity. Further pilot studies had established that under normal conditions subjects would choose to listen to these on an equal number of occasions, and control subjects in the main study behaved similarly. However, subjects who had been insulted chose to listen to the simple melodies for about 70% of the time. This indicates that they used their musical selections as a means of reducing their previously high level of arousal to a more moderate, comfortable level: aspects of the listening situation interacted with musical preference in line with the view of individuals as mood- and emotion-optimisers. This was further demonstrated by another section of the study in which insulted subjects were able to retaliate against the person who insulted them *before* they chose between the high and low complexity melodies. Previous studies had already shown that such retaliation would reduce subjects' level of arousal, and when they did retaliate then subjects' musical selections were similar to those of the controls. 'The findings ... show that a socially induced change in a listener's emotional state may strongly affect that person's aesthetic choice' (Konecni, 1982, p. 503). Also, the effects of retaliation on musical preference indicate that 'in addition, the execution of actions directed at social targets affects the actor's emotional state, which, in turn, regulates subsequent (musical) behavior' (p. 503).

In a similar vein, Konecni also suggested that musical preference should be subject to an interaction between musically-evoked arousal and cognitive demands resulting from the tasks carried out concurrently with listening to music. This is because of the influence of these two sources of information on subjects' cognitive load. 'Listening to a piece of music requires cognitive work; it requires that the components of which the piece of music consists be analyzed and processed, and that their meaning be extracted (e.g. Berlyne, 1971; Gunzenhauser, 1962; Moles, 1958; Morris, 1957; Perkins and Leondar, 1977)' (Konecni, 1982, p. 505). As a result of this, Konecni (1982) argued that musically-evoked arousal reduces the amount of attentional space available for task performance (e.g. Broadbent, 1971; Easterbrook, 1959), and so musical preferences should reflect an attempt to release processing capacity so that this can be devoted to the task rather than to the music.

This idea was investigated by Konecni and Sargent-Pollock (1976). Subjects carried out tasks which differed in the extent to which they required processing effort. Whilst doing this, they chose to listen to either simple (i.e. unarousing) or complex (i.e. arousing) melodies. Subjects carrying out cognitively-demanding tasks were less likely to select the complex melodies than were subjects carrying out less demanding tasks. 'More processing capacity was presumably allocated to these cognitively more demanding tasks (cf. Kahneman, 1973); since complex (musical) stimuli are more difficult to process than simple (musical) stimuli and given that the option existed, subjects chose to listen to the less demanding additional stimulation, (namely) simple melodies' (Konecni, 1982, p. 507). More simply, the complex tasks took up more processing capacity, and so subjects listened to simpler, less demanding melodies in order to compensate for this. As well as being theoretically important, studies such as these have obvious practical implications such as describing how music could be used to induce calm in otherwise violent situations, or how a car driver's performance might be influenced by in-car music, attention to the music, and the attentional demands of the driving task (see Konecni, 1982, p. 507; and Chapter 14).

Prototypicality and appropriateness Aside from Konecni's arousal-based adaptation of Berlyne's theory, it is possible that the preference for prototypes model provides another way of considering the relationship between music and the listening situation, since it allows us to investigate the influence of the appropriateness of music for a given context. Indeed, Whitfield (1983) discussed 'appropriateness' directly in studying the importance of stimulus typicality. He defined typicality as the extent to which his stimuli (different chair designs) were appropriate exemplars of the category 'chair'. For example, Georgian chair designs were preferred to art nouveau chair designs, and were also considered to be generally more typical and appropriate examples of chairs. Similar findings are reported by Whitfield and Slatter (1979). This approach can be used to operationally equate the appropriateness of music for a given situation with the extent to which it approximates to the music that is experienced frequently in that situation, and therefore constitutes a typical and appropriate exemplar of the category in question. The closer that a given piece approximates to the music that is usually experienced in a situation, so the more typical and appropriate it should be. This means that all other things being equal, typical/ appropriate music should be preferred to less typical/inappropriate music. More simply, typical/appropriate music leads to stronger category activation than untypical/ inappropriate music, and so the former should be preferred.

Given some of the arguments presented earlier in Part A, it seems pertinent to comment here on the approach to typicality/appropriateness taken by the studies in this part of the thesis. The paragraph above indicates that the preference for prototypes model may be relevant to an explanation of the relationship between music and the immediate listening environment. However, it may also be interesting to investigate the variables that initially cause a given type of music to become typical in a given situation. For example, Konecni's research suggests that the music most typically experienced in a given environment may be that which brings about a moderate level of arousal. Consequently, in conjunction with investigating typicality/appropriateness per se, it may be informative to also consider what underlies this factor.

The above arguments indicate that there is a need for research to determine the ecological validity of theories of experimental aesthetics; that responses to music may be influenced by the listening situation; and also that responses to the listening situation may be influenced by music. In light of this, Part B of the thesis considers the relationship between music and the everyday contexts in which it is experienced. Chapter 8 tests Berlyne's theory in an everyday listening situation, namely a cafeteria. Further data on this is provided by a study reported in Chapter 9: this tests Berlyne's theory and also the adaptation of the preference for prototypes model outlined above in aerobic exercise and yogic relaxation classes, and in so doing suggests a relationship between liking for music and its appropriateness for the listening situation. Chapter 10 describes a questionnaire study which suggests the nature that this relationship might take, and Chapter 11 provides some experimental evidence supporting this. In effect, Chapters 8 and 9 concern the extent to which existing theories of musical preference operate under naturalistic music listening circumstances, and Chapters 10 and 11 consider how the listening environment can influence responses to music. Chapters 12-14 take the opposite approach to Chapters 10 and 11 by investigating how music can influence responses to the listening environment. Chapter 12 considers how musical complexity and style can mediate responses to television advertisements. Chapter 13 continues this approach by investigating how the same musical variables can mediate more general responses to the listening environment. Finally, Chapter 14 studies the relationship between performance on a motor racing computer game, the arousing qualities of concurrent music, and liking for that music.

Chapter 8. Responses to Music in a Dining Area

This study considers the extent to which musical complexity can explain liking for the music experienced in one naturalistic listening situation, namely a cafeteria. Is there an inverted-U relationship between these variables under such circumstances ? The study also investigates the effect of variations in musical style: the real-world music we hear on the radio or in shops varies along *several* dimensions. For example, two musical pieces may be of equivalent complexity but also vary in style, and this variation may be associated with other differences between the pieces in terms of e.g. their familiarity or appropriateness for the listening situation. It would be useful to have some initial exploratory data on whether these variations cause a breakdown in the inverted-U relationship between liking and the complexity of real music experienced in everyday contexts. In short, if we are to consider responses to real music in real-world listening situations it is crucial to accept that other variables such as musical style may intervene in the straightforward relationships discovered by highly controlled laboratory studies.

In view of the commercial implications of research on responses to music experienced in naturalistic settings, the present study also investigated the extent to which diners in the cafeteria noticed the music that was played. If the music that is presented in commercial environments remains unnoticed irrespective of its characteristics, then this would suggest that it is unnecessary to spend large sums of money on its selection. There are no empirical data concerning this issue, but it seems reasonable to predict that disliked music should be noticed more than music of neutral affect as an aspect of the environment that people might like to change. More simply, music should become a more salient feature of the environment as dislike for it becomes more extreme.

In the present study, four music conditions were presented in an on-campus student cafeteria, and the two measures of response were the extent to which each condition was noticed by diners as an aspect of the environment which they might like to change, and diners' liking for each condition. The four music conditions represented low complexity new age music, high complexity new age music, moderate complexity new age music, and moderate complexity Wurlitzer/mechanical organ music. These two musical styles were selected firstly, because they are relatively disparate in nature; and secondly, because new age music is a relatively popular style amongst young people that could reasonably be expected to elicit a full range of preference decisions: Wurlitzer/mechanical organ music might well be comparatively disliked, and should

indicate any limitations in complexity as a means of explaining preference for real music heard in everyday situations. Four specific hypotheses were tested. The principal hypothesis, based on Berlyne's theory, is that the moderate complexity new age condition should be preferred to the high and low complexity new age conditions. Secondly, a positive correlation should maintain between liking for the music and the number of aspects of the environment subjects state they would like to change before citing the music. If the music is liked, subjects should state many aspects of the environment they would like to change before citing the music, whereas if the music is disliked, subjects should not state many aspects of the environment that they would like to change before citing the music. Thirdly, given the predictions of Berlyne's theory, subjects should be less likely to cite the music as an aspect of the environment they might change in the moderate, as compared to the high and low complexity new age conditions. Finally, any differences between the moderate complexity new age and moderate complexity organ music conditions should indicate the extent to which the proposed inverted-U relationship between liking and complexity is mediated by other factors.

Method

Participants The cafeteria was situated in a university Student Union building. This means, with the exception of catering staff, that all those present in the cafeteria were considered eligible for the study, such that the sample comprised 251 students at a university in the East Midlands region of the U.K. Subjects were recruited by approaching diners at their tables, and asking them to complete a brief questionnaire about the cafeteria. Seven subjects' responses had to be discarded since the time they took to complete the questionnaire spanned two music conditions. A further 8 people declined to participate, leaving a total of 236 usable questionnaires. The numbers completed in the low complexity new age, high complexity new age, moderate complexity new age, and moderate complexity organ conditions respectively were as follows; 64 (32 males, 32 females), 74 (37 males, 37 females), 43 (21 males, 22 females), and 55 (27 males, 28 females).

Materials and design

i) Experimental music Fifteen undergraduate subjects (mean age = 20.2 years, 6 males and 9 females) rated the complexity of 32 non-lyrical excerpts in a small pilot study. Complexity was defined such that high complexity excerpts were 'unpredictable, erratic, and varied', whilst low complexity excerpts were 'predictable, simple, and

uniform'. The 32 excerpts contained 12 excerpts of new age music, selected on the basis of an earlier study (see Chapter 6) so as to putatively represent low, moderate, and high levels of complexity. New age excerpts were identified as such on the basis of classifications contained in the Music Master Catalogue (1993). The remaining 20 excerpts were of Wurlitzer/mechanical organ music, and were selected so as to putatively represent moderate levels of complexity (although determination of the complexity of all 32 excerpts was of course the purpose of the pilot study). All excerpts were of 30 seconds duration, and were selected to be representative of the piece from which they were taken. Chapter 6 showed that such excerpts lengths were sufficient for subjects to reliably rate complexity. The excerpts were then recorded in two random orders on an audio tape, with a 10 second gap between excerpts to allow subjects time to mark their rating. The two excerpt orderings were presented to 7 and 8 subjects respectively. After each excerpt ended, subjects rated its complexity on an 11-point Likert scale where 0 = 'low complexity', and 10 = 'high complexity', and 5 = 'midway between the two'. Any possible effects of familiarity with the excerpts were dealt with by asking all subjects to indicate if they had heard any of the pieces previously. None of the subjects did this, although if they had then their ratings would have been discarded. The mean ratings assigned to each of the 32 pieces were calculated separately for the two excerpt orderings, and the product-moment correlation coefficient between these two sets of ratings was highly significant ($r = +0.85$, $N = 32$, $p < 0.001$). This indicates that subjects' complexity ratings were reliable, and the overall mean rating for each excerpt was then calculated.

This allowed the selection of 4 low complexity new age excerpts, 4 high complexity new age excerpts, 4 moderate complexity new age excerpts, and finally 4 organ music excerpts that were of equivalent complexity to the moderate complexity new age excerpts. Details of the 16 excerpts selected are presented in Appendix 8.1, which indicates that the differences between low, moderate, and high complexity categories were extreme. Two and a half minute versions of these 16 excerpts were recorded from the original versions on an audio tape, such that the four pieces from each musical category were recorded consecutively into 10 minute 'blocks' for each condition. Two different orderings of these conditions were recorded.

It is worth stating explicitly that high and low complexity mechanical organ music excerpts were not included in the study. This was for two reasons. Firstly, the principal aim of the study was to investigate the effects specifically of musical *complexity* on responses to real music from a single style experienced in an everyday listening context. Secondly, the moderate complexity organ music excerpts included

in the design are intended solely to investigate whether the inverted-U relationship between complexity and liking for real music is mediated at all by other factors. As noted above, laboratory studies of artificial stimuli have tended to manipulate a single musical variable: real musical stimuli vary in many other ways such as musical style (and consequently perhaps familiarity and congruity). This may well have an additional influence on subjects' responses, such that when studying preference for real music we may over-simplify the problem by investigating only a single variable. This study aims to simply carry out an initial, tentative investigation of this idea.

ii) Presentation of music The music was played through a loudspeaker situated next to an advice stall set up by the experimenter. A wide variety of university and student union societies regularly set up stalls in the cafeteria area, and these frequently played music. Consequently, this means of music presentation was as naturalistic as possible. The stall consisted of two tables situated in a clearly visible area of the cafeteria. On the tables was a wide range of leaflets offering advice on welfare issues relevant to students such as debt, inexpensive recipes, and alcohol consumption. The stall and surrounding area were decorated with a number of specially produced colour posters advertising what was on offer. The same male postgraduate student staffed the advice stall throughout the experiment.

iii) Dependent measures Two variables were investigated by means of a questionnaire administered by three female experimenters to diners in the cafeteria. Diners were approached only if they were seated in the half of the cafeteria where the stall was situated. Subjects were firstly asked to verbally list 'what they would change about the cafeteria'. This provided a measure of the salience of the music. The experimenter noted the number of factors that each diner stated before citing the music that was currently playing. It is worth noting that the cafeteria had just been renovated, and all subjects noted several aspects which they would like to change. If the music was not cited after 6 other aspects had been mentioned, the response to this variable was regarded as a missing value. A second measure was then taken in which subjects rated their liking for the music currently playing. Ratings were assigned on an 11-point Likert scale ranging from 0 = 'dislike very much' to 10 = 'like very much', with 5 equalling 'midway between the two'. As before, any possible effects of familiarity with the excerpts themselves were dealt with by asking all subjects to state if they had heard the music previously. None of the subjects did this, although if they had then their ratings would also have been discarded. Note that although the specific experimental stimuli were all novel to subjects this does not preclude the possibility that the two styles employed were differentially familiar.

Procedure Testing was carried out between 11.00am and 2.30pm on two consecutive days in a Student Union cafeteria on a university campus. Between these times the cafeteria was full on both days, with a very small number of untaken tables. On each of the two days of testing, one of the two prepared orderings of the conditions was played four times. The volume was held constant at a level that was considered to be sufficient to be heard clearly, whilst allowing diners to talk over it. Experimenters began approaching diners with the questionnaire one minute after each music condition began on the tape. Subjects were allowed as long as they required to give their responses.

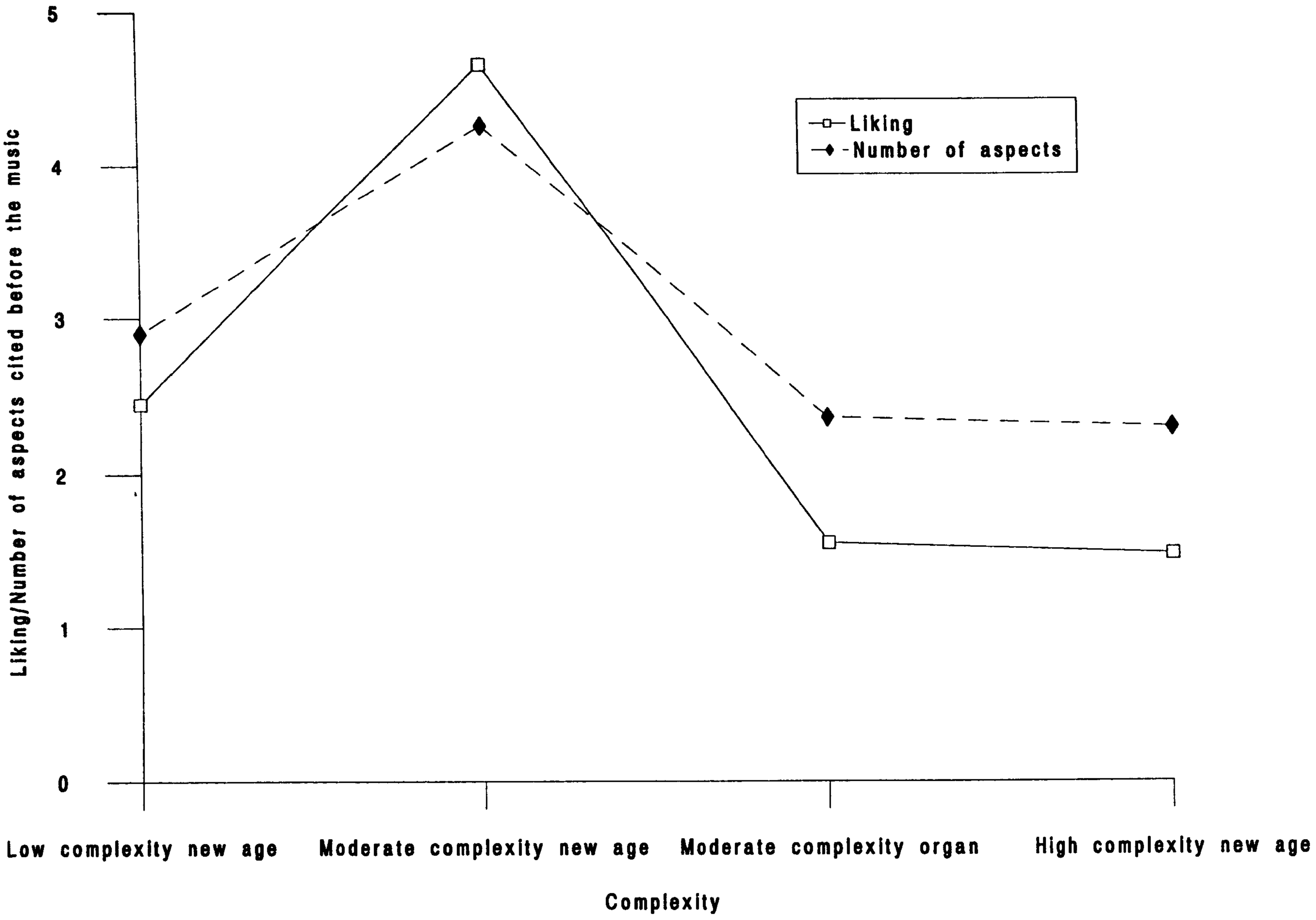
Results and Discussion

A one-way independent subjects ANOVA and Tukey HSD tests were calculated to determine differences in liking ratings assigned to the four music conditions. A highly significant F ratio obtained ($F = 19.01$, d.f. = 3, 227, $p < 0.01$), with Tukey tests indicating that the mean rating assigned within the moderate complexity new age condition (mean = 4.66) was significantly higher than the mean rating assigned to each of the three remaining conditions. No significant differences obtained between these three remaining conditions. The mean ratings assigned to each condition are presented in Figure 8.1.

The differences in liking between the three new age conditions were consistent with an inverted-U hypothesis, since the moderate complexity condition was liked significantly more than both the low or high complexity conditions. This indicates that Berlyne's theory is a valid explanation of preference when real music is experienced in an everyday situation. Also, subjects disliked moderate complexity mechanical organ music as much as the high and low complexity new age conditions, and liked the former condition significantly less than new age music of equivalent complexity. This indicates that factors other than complexity can influence everyday musical preferences: although complexity is an important determinant of aesthetic response, future research should not neglect other variables.

A product-moment correlation coefficient was calculated between ratings of liking for the music and the number of aspects of the cafeteria which subjects stated they would change before citing the music. The obtained coefficient between these variables was $r = +0.36$ ($N = 223$, $p < 0.01$) which although small was significant, and indicates that the more that subjects disliked the music, the fewer the number of aspects of the

Figure 8.1 - Mean Liking Ratings and the Mean Number of Aspects Cited Before the Music



environment they stated they would change before citing the music. More simply, the music became an increasingly salient feature of the environment as dislike for it became more extreme. It should be noted that none of the current musical conditions was liked strongly by subjects: it is possible that strongly liked music would also be more salient than music of neutral affect (i.e. the present moderate complexity new age condition). This could be investigated through measures of those environmental aspects that subjects would like to remain unchanged.

These effects of liking for music on the extent to which it was a salient feature of the environment were predictable from the characteristics of the musical conditions. A one-way independent subjects ANOVA was calculated to determine differences between the four conditions in the number of aspects of the cafeteria subjects stated they would change before citing the music, yielding a highly significant F ratio ($F = 5.77$, d.f. = 3, 219, $p < 0.01$). Subsequent Tukey HSD tests indicated that subjects nominated more aspects of the environment that they would change before citing the music in the moderate complexity new age condition (mean = 4.26). This value was significantly higher than in either the high complexity new age or the moderate complexity organ conditions. The mean number of aspects cited before the music within each condition are presented in Figure 8.1.

Figure 8.1 indicates that these responses to the music were again consistent with Berlyne's theory. Moderate complexity new age music was less readily cited as a feature of the environment subjects would change than was music in the low or high complexity conditions (although the difference between moderate and low complexity new age conditions failed to attain statistical significance). The significant difference between the moderate complexity new age and moderate complexity organ conditions again indicates that factors other than complexity need to be taken into account when explaining responses to real music.

In conclusion, the present results reveal two interesting features of responses to music experienced under naturalistic conditions. Firstly, variations in musical complexity can explain variations in liking for real music experienced in an everyday listening situation. However, this effect occurred only for pieces drawn from *within* the new age style. This represents a limitation on the importance of musical complexity, and suggests that those selecting music for a naturalistic environment such as a shop ought to be aware of other factors (which may possibly include familiarity with the music, its appropriateness for the listening situation etc.). Future studies could investigate this further. Secondly, the results indicate that music *is* a salient feature of those everyday

environments in which it is experienced, and that this salience increases if the music is disliked rather than of neutral affect. Whilst music may perhaps only function as a backdrop to other activities, the present music was an aspect of the environment that subjects responded to in a lawful manner, indicating that the vast sums spent on the commercial uses of music are perhaps justified.

Chapter 9. Liking for Music in Aerobic Exercise and Yogic Relaxation Classes

Chapter 8 indicates that, with some limitations, Berlyne's theory may well be applicable to real-world music listening situations. In addition to the obvious need to replicate this finding, the arguments presented in Chapter 7 suggest that there may also be a relationship between liking for music and its perceived appropriateness for the listening situation when the latter is described in terms of typicality. The present study aims to address these issues, and uses an approach which minimises the degree of intrusion into a naturalistic music listening situation.

To achieve this, 5 musical excerpts (each of three-minutes duration) were played to participants during either their regular aerobic exercise or yogic relaxation classes: music was always played in the course of these classes as the tutor gave her instructions. At the end of the classes, the 5 excerpts were rated for 'liking', 'complexity', and 'appropriateness'. It should be noted here that it is unlikely to be possible to compare the yoga and aerobics group's liking for any specific excerpt (cf: Konecni's studies) since any variation in preference may be attributable to either differences in the circumstances in which the excerpt was heard or to differences in the extent to which it was perceived as complex and/or appropriate. Rather, two different music listening situations were employed to provide separate parallel tests of the experimental hypotheses under conditions which differ considerably in terms of situational arousal.

Four hypotheses may be made regarding the relationships between subjects' ratings. Firstly, Berlyne's theory predicts that an inverted-U relationship should exist between the 'liking' and 'complexity' ratings assigned to the excerpts within both the yoga and aerobics groups. Secondly, on the basis of the preference for prototypes model, a positive monotonic or U-shaped relationship should be found within both groups between ratings of 'liking' and 'appropriateness'. Third, given the prediction of a positive relationship between liking and appropriateness, an inverted-U relationship should exist within both groups between ratings of appropriateness and complexity. If ratings of appropriateness are similar to ratings of liking, then moderate levels of complexity should also be perceived as being most typical/appropriate as well as being most liked. Finally, it is also possible to carry-out an initial investigation into any differences between the groups in their ratings of liking, complexity, and appropriateness *across* all 5 excerpts. For example, if one group assigned higher liking and appropriateness ratings, whilst there was no difference in complexity

ratings, then this would suggest a relationship between liking and appropriateness that was independent of complexity.

Method

Subjects 100 subjects participated, with 50 in each of the 'aerobics' and 'yoga' groups. Since the primary concern was to recruit people who normally participated in these classes, it was impossible to randomly assign subjects to aerobics or yoga groups. However, the two groups matched closely on age, sex distribution, socioeconomic background, musical training, preferred musical style, and the number of hours they spent listening to music.

The aerobics group contained 50 females with a mean age of 31.9 years (s.d. = 9.66, range = 15-58 years). The yoga group contained 43 females and 7 males with a mean age of 29.7 years (s.d. = 11.98, range = 18-59 years). Secondly, all classes drew participants from local areas, and were conducted in the suburbs of a city in the East Midlands region of the U.K. Thirdly, after considering a self-report measure of subjects' musical training and experience, a panel of three independent judges (who were unaware of which group subjects belonged to) determined that similar numbers in both the aerobics and yoga groups possessed low, intermediate, and high levels, i.e. 31, 13, and 6 subjects in the aerobics group, and 27, 16, and 7 subjects in the yoga group respectively. Fourthly, in a measure of preferred general musical style, subjects were asked to state which of three broad styles they listened to most often. Similar numbers from each group selected each of classical, jazz, and pop/easy listening, i.e. 9, 1, and 40 respectively in the yoga group, and 7, 4, and 39 respectively in the aerobics group. Finally, the two groups reported spending a similar number of hours per week deliberately listening to music, with a mean of 7.62 hours (s.d. = 6.73, range = 0-30 hours) reported by the aerobics group, and a mean of 6.84 hours (s.d. = 5.01, range = 0-20 hours) reported by the yoga group.

Experimental stimuli From the 60 musical excerpts employed in Chapter 6, 5 new age/ambient dance excerpts were selected that could be used in both yoga *and* aerobics classes; that were likely to be unknown to subjects; and that should represent a wide range of complexity. The 5 excerpts selected from Chapter 6 represented approximately very low, low, moderate, high, and very high complexity levels. Three-minute representative excerpts were recorded in two quasi-random orders onto separate audio tapes. Two further excerpts were selected from those employed in Chapter 6, from which 3 minute representative excerpts were again taken: one of these

excerpts was recorded immediately before the 5 experimental excerpts, and the second of the two excerpts was recorded immediately after the 5 experimental excerpts. Consequently, the experimental excerpts were presented within a consistent musical context. (In practice, *all* the music in the aerobics classes was held constant and presented in the same order across classes: in the yoga classes, the experimental tape comprised the only music employed in the class.) Finally, the 30-second excerpts employed in Chapter 6 as representative of the 5 experimental excerpts were recorded at the end of the two experimental tapes. These 30-second excerpts served as the 'reminder excerpts' described below. Their ordering was matched to that of the 3 minute excerpts. Details of these excerpts appear in Appendix 9.1.

Design Half of the subjects in each group rated the 5 experimental excerpts on an 11-point scale of 'liking'. The remaining subjects rated the 5 experimental excerpts on an 11-point scale of 'appropriateness' *and* an 11-point scale of 'complexity'. This design feature was based on Sluckin, Colman, and Hargreaves' (1980) discussion of within- and between-subjects designs in experimental aesthetics, since 'liking' may be seen as the dependent variable in the present study. On the rating scales, 0 = 'disliked very much'/'very inappropriate'/'very low complexity', 10 = 'liked very much'/'very appropriate/'very high complexity', and 5 = 'midway between the two'. 'Complexity' was defined to participants as the extent to which each excerpt was unpredictable, varied, and erratic. 'Appropriateness' was defined to participants as the extent to which each excerpt was typical of the music usually employed in the classes. Any possible effects of familiarity with the excerpts were dealt with by asking all subjects to circle the ratings assigned to pieces they had heard previously, and excluding these ratings (6 in all) from the analyses.

The sample was collected over several classes, with subjects in each individual class rating liking *or* complexity and appropriateness. 12 or 13 subjects in each group x rating scale combination were presented with each of the two excerpt running orders. All members of the classes involved agreed to participate, although the responses of four subjects who rated 'liking' in the aerobics group were discarded, so that the mean ratings on which statistical analyses were carried out were based on an equal number of responses. Two participants arriving late at the classes were not counted as part of the sample of 100, and their ratings were also excluded from the analyses.

In the aerobics group, the same instructor conducted all the classes, using exactly the same routine throughout each. The experimental excerpts were played during the final 20 minutes of the class. During this period, a sequence of floor-work exercises was

conducted (e.g. sit-ups), producing a minimum of background noise. Four sessions were required to complete the data collection. In the yoga group, the same instructor conducted all the classes, again using exactly the same routine throughout each, and playing the experimental music during the final 20 minutes of the class. The aim of this part of the class was to induce a state of deep relaxation. During this period, the instructor employed her usual method of playing a tape of her voice, allowing her to circulate amongst the participants. Four sessions were required to complete the data collection. Thus the format of individual sessions was held constant within groups, and the method of stimulus presentation was held constant between groups.

Procedure At the beginning of each class, participants were informed that research was being carried out to investigate the pieces of music played over the final 20 minutes of the class. In the relevant sessions, participants were told that they would be rating individual excerpts for liking or complexity and appropriateness, and participants were asked to consider each piece of music in these terms once the class tutor instructed them to do so. The rating scales were described, and 'complexity' and 'appropriateness' were then defined in the relevant classes. The class then proceeded as usual. Immediately before the experimental excerpts were played, the class instructor asked participants to consider each of the following excerpts in terms of 'liking' or 'complexity' and 'appropriateness'. The instructor ended the class as the experimental tape finished, and response sheets were quickly distributed. Subjects followed instructions from the top of their response sheet, whilst the experimenter read them aloud. These contained a reminder of the definitions and the rating scales. The instructions then emphasised that ratings should express subjects' impressions of each piece 'as it was playing during the class'. Having determined that these instructions had been understood, the experimenter played the 'reminder excerpts', and subjects rated each experimental excerpt in turn.

Results

To check for possible order effects in the data, separate product-moment correlation coefficients were computed between each of the two excerpt running orders for each rating scale x group combination, using the mean ratings assigned to each of the 5 excerpts. The coefficients ranged between +0.96 and +0.99 ($p < 0.001$, $N = 5$). This rules out the possibility of order effects influencing the results.

Mean ratings were then calculated for each excerpt x variable combination. Curvilinear regression analysis was employed to test the significance with which

linear and quadratic models fitted the relationship between mean liking and mean complexity ratings. Only the quadratic model was fitted significantly to the yoga group data ($R^2 = 0.99$, $F = 109.52$, d.f. = 2, $p < 0.01$), yielding a regression equation of $Y = -1.24 + 3.70X - 0.40X^2$ which confirms that an inverted-U relationship held between their liking and complexity ratings. In the aerobics group data, the fit of the quadratic model only approached statistical significance ($R^2 = 0.84$, $F = 5.12$, d.f. = 2, $p = 0.16$), whilst the fit of the linear model was significant ($R^2 = 0.83$, $F = 14.49$, d.f. = 3, $p < 0.05$). However, values of R^2 indicate that the quadratic model explained slightly more of the variance in ratings of these variables than the linear model. Figure 9.1 illustrates the quadratic regression curves between liking and complexity ratings assigned by the two groups: the shape of the curve for the aerobics group ($Y = 6.71 - 0.02X - 0.07X^2$) further illustrates that any inverted-U relationship between their liking and complexity ratings was rather weak.

Curvilinear regression analysis was then carried out for both groups to test the fit of both linear and quadratic models to the relationship between mean liking and appropriateness ratings assigned to the 5 experimental excerpts. The linear and quadratic models were both fitted significantly to the data in both the aerobics ($R^2 = 0.98$, $F = 137.80$, d.f. = 3, $p < 0.01$; and $R^2 = 0.99$, $F = 138.95$, d.f. = 2, $p < 0.01$ respectively), and yoga groups ($R^2 = 0.96$, $F = 80.79$, d.f. = 3, $p < 0.01$; and $R^2 = 0.97$, $F = 36.97$, d.f. = 2, $p < 0.05$ respectively). The values of R^2 indicate that in both groups, the quadratic model was better fitted to the data, with regression equations of $Y = 0.72 + 0.24X + 0.15X^2$ and $Y = 1.73 - 0.21X + 0.13X^2$ respectively. These quadratic relationships are illustrated in Figure 9.2, and their positively accelerating nature indicates that they correspond with the preference for prototypes model. It should be noted that despite the slightly greater fit of the quadratic model in both groups, the mean ratings in Figure 9.2 and the R^2 values associated with the fit of the linear model to these data suggest that these relationships could be interpreted as simply positive in nature. However, whichever of these two interpretations is favoured by the reader, the nature of both the quadratic and linear relationships between liking and appropriateness corresponds with the theoretical predictions of the preference for prototypes model.

Curvilinear regression analyses were calculated to test the significance of fit of both linear and quadratic models to the relationship between complexity and appropriateness ratings. Although this relationship was significantly fitted to a linear model within the yoga group ($R^2 = 0.89$, $F = 25.12$, d.f. = 3, $p < 0.05$), the significance of fit, and the associated value of R^2 were greater for the quadratic model ($R^2 = 0.99$,

Figure 9.1 - Quadratic Regression of Mean Liking Ratings on Mean Subjective Complexity Ratings Assigned by Yoga and Aerobics Participants to 5 Musical Excerpts

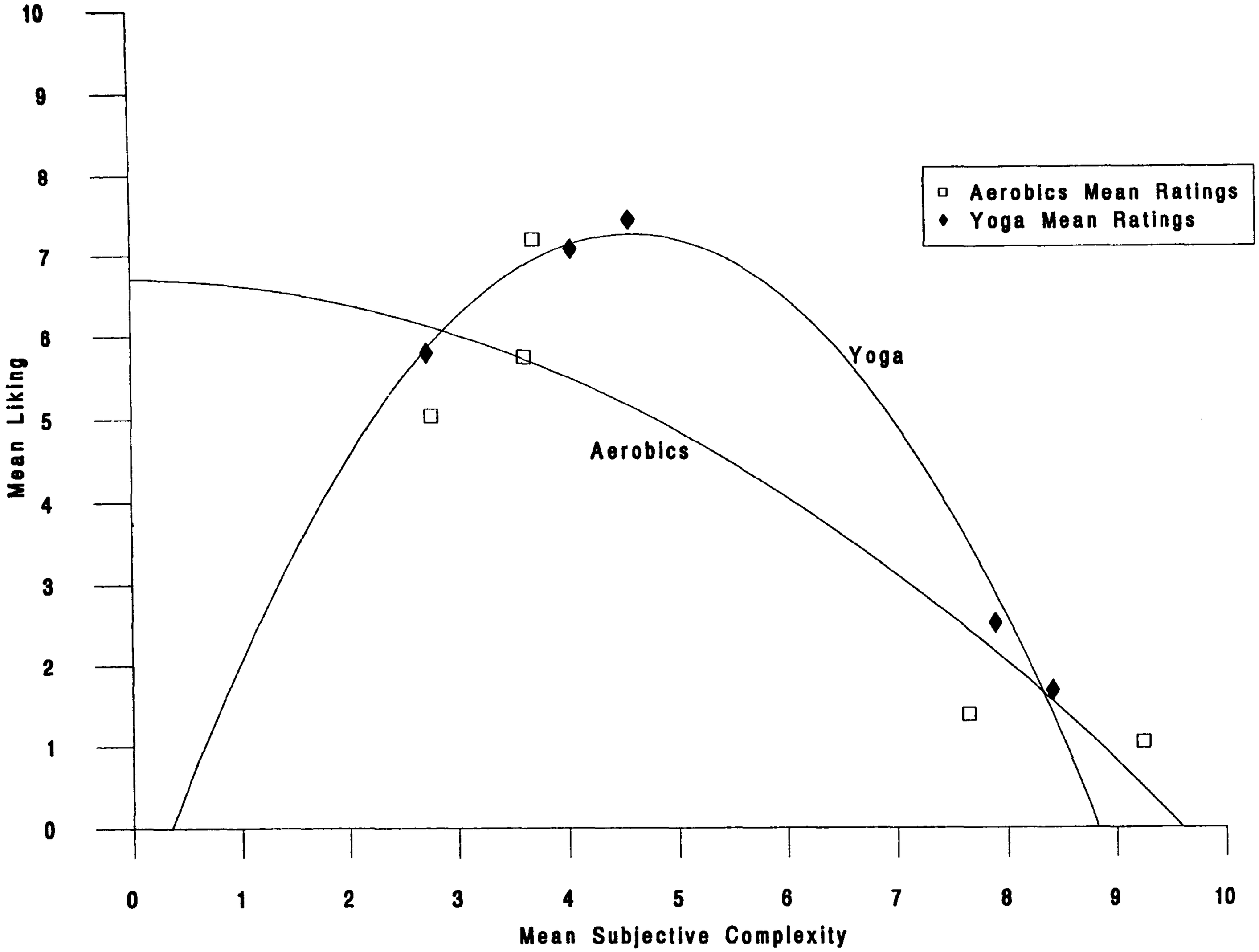
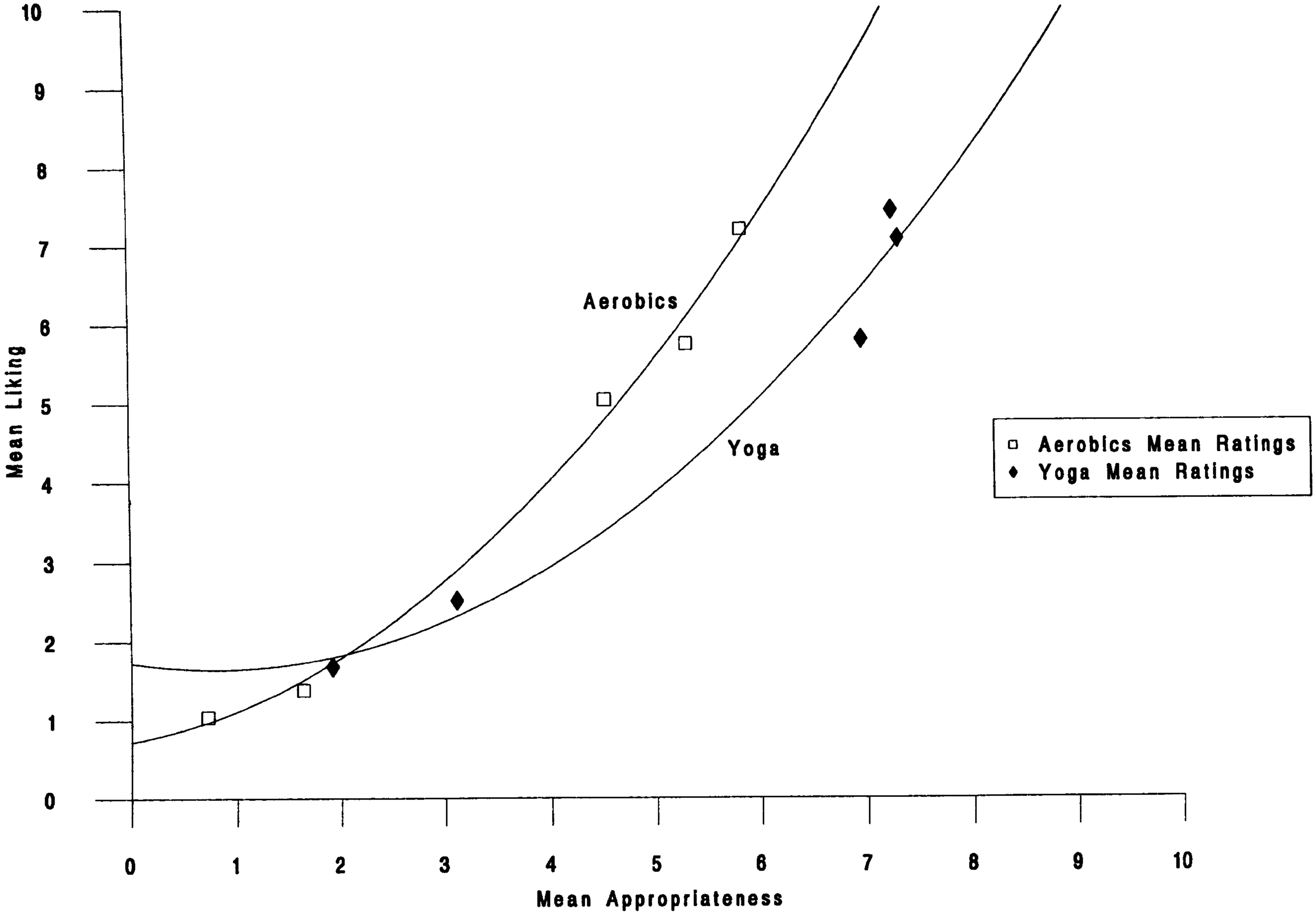


Figure 9.2 - Quadratic Regression of Mean Liking Ratings on Mean Appropriateness Ratings Assigned by Yoga and Aerobics Participants to 5 Musical Excerpts



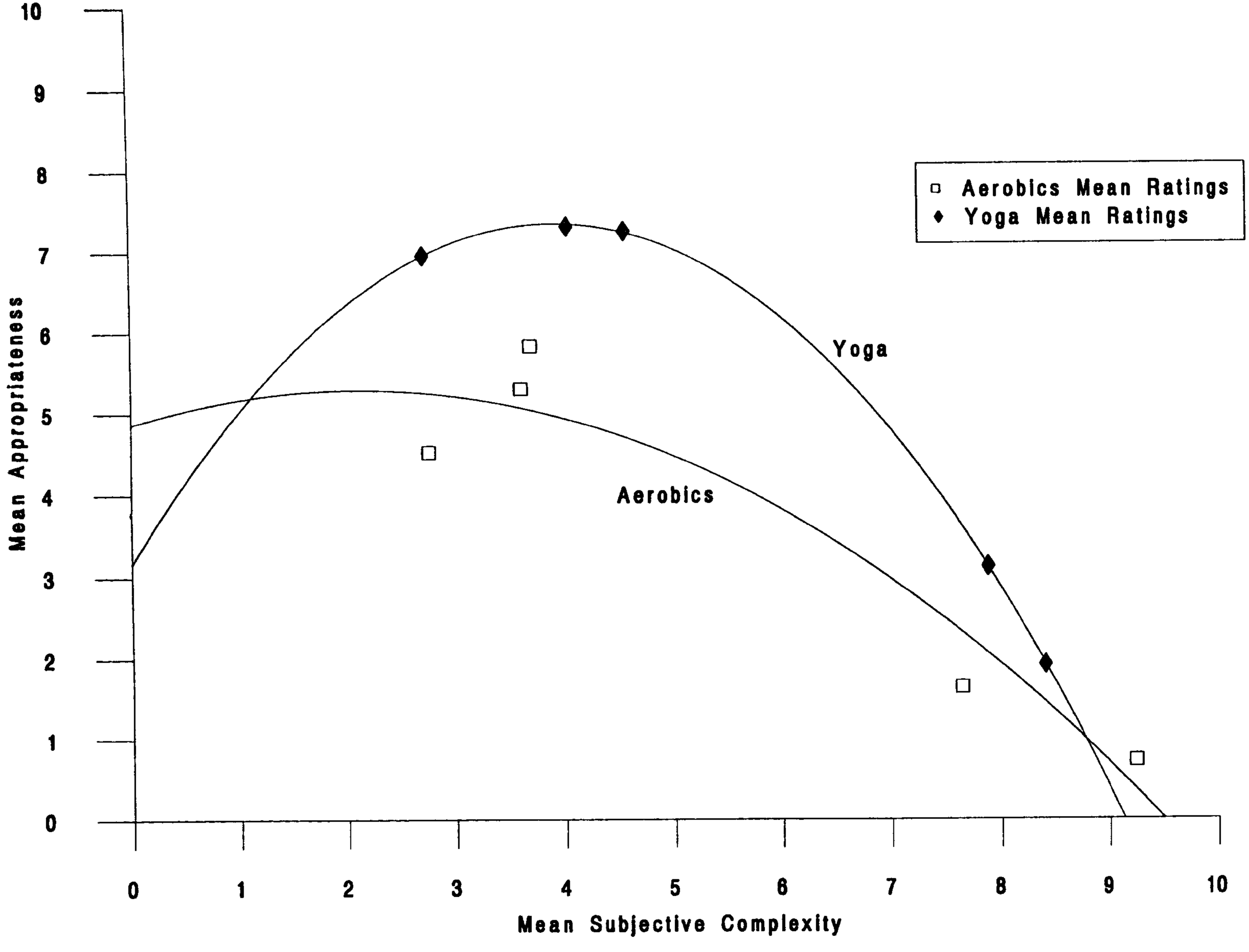
$F = 534.19$, d.f. = 2, $p < 0.001$), with the resulting regression equation of $Y = 3.16 + 2.13X - 0.27X^2$ indicating that the data is best described as fitting an inverted-U curve (see Figure 9.3). The complexity and appropriateness ratings assigned by the aerobics group were significantly fitted to a linear model ($R^2 = 0.89$, $F = 24.90$, d.f. = 3, $p < 0.05$). However, the fit of the quadratic model also approached significance ($R^2 = 0.91$, $F = 10.60$, d.f. = 2, $p = 0.08$), and the associated values of R^2 indicated that the quadratic model was able to predict more of the variance in these data than the linear model. Consequently, given a quadratic regression equation of $Y = 4.86 + 0.41X - 0.10X^2$, the mean ratings assigned by the aerobics group (see Figure 9.3) are also perhaps best described as following an inverted-U relationship (although not significantly so).

Finally, independent t-tests were calculated to test for differences between the groups on each of the three rating scales. The yoga group assigned higher liking and appropriateness ratings than the aerobics group (yoga mean = 4.90, aerobics mean = 4.11, $t = -2.03$, d.f. = 244, $p < 0.05$; and yoga mean = 5.28, aerobics mean = 3.54, $t = -4.13$, d.f. = 240, $p < 0.001$ respectively). The complexity ratings assigned by the two groups did not differ significantly (yoga mean = 5.54, aerobics mean = 5.45, $t = -0.22$, d.f. = 240, $p = 0.82$).

Discussion

The results broadly support the prediction of Berlyne's theory that there should be an inverted-U relationship between ratings of liking and complexity. The quadratic model was significantly fitted to the yoga group's liking and complexity ratings. Moreover, the evidence above indicates that the liking and complexity ratings assigned by the aerobics group, although not significantly fitted to a quadratic model, are also best described as conforming to the inverted-U hypothesis. Two arguments support this claim. Firstly, the quadratic regression equation and associated value of R^2 indicate that an inverted-U function did at least explain slightly more of the variance in ratings than a linear model. Secondly, the mean ratings for the aerobics group illustrated in Figure 9.1 give the strong visual impression of an inverted-U: with increasing complexity, liking initially increases, but then decreases substantially. Consequently, the relationship between liking and complexity ratings assigned by the aerobics group is also likely to be weakly consistent with Berlyne's theory.
Complexity does appear to be associated with liking for 'real' music experienced by members of the general public under naturalistic music listening conditions. These

Figure 9.3 - Quadratic Regression of Mean Appropriateness Ratings on Mean Subjective Complexity Ratings Assigned by Yoga and Aerobics Participants to 5 Musical Excerpts



relationships were found in two settings which differed greatly in situational arousal, and are generally consistent with the conclusions of Chapter 8.

However, the strength of the relationship between liking and complexity is of considerable interest. There was only weak evidence that this relationship took the form of an inverted-U curve in the aerobics group: although a quadratic function appears to be the best description of the results, the level of statistical significance and the regression curve illustrated in Figure 9.1 mean that the proof of an inverted-U relationship is far from convincing. It is possible that the fit of the data to an inverted-U model was reduced by the similarity in the complexity ratings assigned by the aerobics group to two of the excerpts (see Figure 9.1), and there is no obvious explanation for this similarity. In the meantime, the aerobics group's data suggests an obvious limitation of the extent to which Berlyne's theory can explain musical preference in a naturalistic setting. It seems that some other factor might have influenced subjects' liking ratings.

The relationships between liking and appropriateness in the two groups appeared to conform to the preference for prototypes model, since they took the form of a U-shaped curve. It could also be argued that these relationships are simply positive, although this too would support the preference for prototypes model. Moreover, whilst the relationship between liking and complexity in the aerobics group failed to correspond significantly with Berlyne's theory, the relationship between liking and appropriateness in this group was clearly as predicted.

The values of R^2 reported above are relevant to this issue: they indicate that the linear and quadratic relationships between liking and appropriateness predicted a similar amount of the variance in these ratings as the quadratic relationship between ratings of liking and complexity: in other words, the predicted relationship between liking and appropriateness was of similar strength to the predicted relationship between liking and complexity. This is particularly interesting given previous authors' arguments that the preference for prototypes model may be more effective than Berlyne's theory in predicting liking for everyday aesthetic stimuli (see Chapters 1 and 6).

In both groups, the relationship between appropriateness and complexity also appeared to be best described as an inverted-U curve. This relationship was statistically significant in the yoga group, and although not statistically significant in the aerobics group ($p = 0.08$), it was better fitted to the data than a linear model. Again the data from the aerobics group seems to be best described as following an inverted-

U relationship, given the visual impression provided by the mean ratings (see Figure 9.3), and the comparative fit of inverted-U and linear functions. Whilst acknowledging the statistical non-significance of the relationship in the aerobics group's data, it does appear that moderate levels of complexity were perceived as most appropriate as well as being most liked: indeed, there is a striking similarity between Figure 9.1 relating complexity to *liking*, and Figure 9.3 relating complexity to *appropriateness*. This suggests that variations in complexity may have at least partly underlain variations in both liking and typicality/appropriateness, with moderately complex music being liked most *and* most typical/appropriate. This relates back to the earlier argument in Chapter 6 that variations in typicality reflect variations in other factors.

It is unfortunate that linear regression and ANCOVA analyses could not be carried out to precisely determine the relative importance of complexity and appropriateness ratings in subjects' ratings of liking for the excerpts. However, since there was an *inverted-U* relationship between liking and complexity, but a *U-shaped or linear* relationship between liking and appropriateness, both forms of analysis were impossible: linear regression and ANCOVA techniques assume that the same form of relationship exists between each independent variable and the dependent variable.

However, some limited evidence suggests tentatively that there was a relationship between liking and appropriateness above and beyond the effects of complexity. Independent t-tests indicated that the yoga group assigned higher liking and appropriateness ratings to the 5 excerpts, whereas complexity ratings did not differ between the two groups. This suggests that the higher liking and appropriateness ratings assigned by the yoga group cannot be attributed to any variation between the groups in terms of the perceived complexity of the pieces. It is also worth noting here that it is very unlikely that liking for music can be the *cause* of, or effectively the same as, it being perceived as appropriate: if it was then, to give an extreme example, a large portion of the population might consider 'Love Me Do' by The Beatles to be very appropriate for a parent's funeral.

In conclusion, whilst the results generally support the validity of Berlyne's theory in a naturalistic setting, other variables such as appropriateness may also be associated with musical preference in these situations. The results also provide some indication that variations in typicality/appropriateness may at least *partly* reflect variations in complexity.

Chapter 10. Situational Influences on Reported Musical Preference

Chapters 8 and 9 have demonstrated that theories derived from laboratory-based studies can generally explain responses to music in mundane, everyday situations such as a cafeteria, and yoga and aerobics classes. The study in the latter two situations indicated that the listening context is related to responses to the music played therein in terms of the extent to which the music was perceived as appropriate for those settings. However, the experimental approaches adopted in Chapters 8 and 9 are also limited in that they can consider only a small number of situations and pieces, and the influence of a small number of specific musical variables.

The research in this chapter addresses this limitation in two ways. The first is to investigate whether liking for a variety of musical characteristics varies with the listening situation: the second is to investigate whether this occurs over a range of different settings in which we are conventionally exposed to music. Since music is experienced in a variety of situations, it might be useful to establish whether these exert any influence on preferred musical characteristics, and if so, whether these influences are pervasive, or particular to only a few given musical characteristics and listening contexts.

One way of achieving this and overcoming the inherent limitations of an experimental approach might be to conduct a survey study that investigates subjects' self-reports of which particular musical characteristics they would like to hear across several hypothetical listening situations. Whilst obviously limited in that subjects are not responding to actual music in actual listening situations, such a technique provides a useful adjunct to experimental studies by allowing investigation of a much larger number of listening situations and musical characteristics. In light of this, an exploratory questionnaire study was carried out to determine how subjects' liking for 27 musical characteristics might vary between 17 different hypothetical listening situations.

Independent groups of subjects were presented with a verbal description of one of these 17 proposed situations, and were asked to rate the extent to which the music experienced therein should possess a series of 27 characteristics if it was to be liked. Three hypotheses may be proposed. Firstly, split-half reliability analyses should indicate that subjects' responses are consensual, i.e. that they agree upon the characteristics that music ought to possess in different situations. Second, subjects' ratings should demonstrate an interaction between the situations and musical

characteristics: ratings assigned to each musical characteristic should differ between the 17 proposed listening situations, indicating that reported musical preference varies with the proposed listening situation. Third, in support of this, correlations between the ratings assigned for different proposed situations should vary considerably, with some coefficients being of negligible magnitude or possibly negative. Finally, exploratory factor analyses were carried out for the musical characteristics and situations to investigate the factors that underlie subjects' responses.

Method

Subjects 393 subjects (87 males, 298 females) participated, with a mean age of 21.2 years (s.d. = 5.49, range = 18-48 years). These subjects were first- and second-year psychology undergraduates at two English universities. To provide further information on the sample, a panel of three independent judges assessed a self-report of musical training and experience made by subjects, and determined that 162, 117, and 114 subjects possessed low, intermediate, and high levels respectively.

Design Seventeen music listening situations were employed so as to represent a wide diversity of real-world music listening environments that were appropriate for an undergraduate sample. The situations presented to subjects were; 1) 'You are at an end-of-term party with friends'; 2) 'You are at a nightclub'; 3) 'You are jogging with your Walkman on'; 4) 'You are doing the washing-up'; 5) 'You are ironing some clothes'; 6) 'You are in the countryside'; 7) 'You are in a restaurant'; 8) 'You are at a posh cocktail reception'; 9) 'You have just broken up with a boyfriend/girlfriend'; 10) 'It is Christmas Day and you are with your family'; 11) 'Your parents have come to visit'; 12) 'It is first thing on a Sunday morning'; 13) 'It is last thing at night and you are about to go to bed'; 14) 'You are making love'; 15) 'You are trying to woo someone over a candlelit dinner for two at home'; 16) 'You are in church'; 17) 'You are driving on the motorway'.

The study employed 27 musical characteristics, and a full listing of these is presented as part of Table 10.1. These characteristics were selected so as to be maximally relevant to the situations employed, and were adapted from research on affective responses to environments by Russell, Ward, and Pratt (1981). Independent groups of subjects were issued with a response sheet on which *one* of the 17 situations and all of the 27 musical characteristics were printed. Subjects were asked to rate the importance of each of the musical characteristics if they were to like the music in that particular situation. Each characteristic was rated on an 11-point Likert scale, where 0 = 'The

music I would like to hear in this situation definitely should *not* possess this characteristic', 10 = 'The music I would like to hear in this situation definitely *should* possess this characteristic', and 5 = 'Midway between the two'. Between 22 and 24 subjects responded to each of the 17 situations, except in the case of 'You are in church' (Situation 16), for which only 20 response sheets were completed.

Procedure Subjects were recruited and tested prior to their timetabled lectures. Response sheets concerning the 17 situations were fully randomised and distributed face down. Subjects were asked to remain silent, and were then asked to turn over the response sheet. Instructions were read from this, and were verbally reinforced by the experimenter. These stressed that subjects should rate the characteristics of the music they would *like* to, rather than merely *expect* to hear. Subjects were also asked to indicate on their response sheet if they had no experience of their given situation: none indicated so, although their responses would have been discarded had this been the case. The subjects were given 5 minutes to think carefully about the music they would like to hear in their given situation before being asked to rate each of the 27 musical characteristics at their own pace. This typically required 5 minutes.

Results

Split-half reliability To determine the internal consistency of subjects' ratings, a split-half reliability analysis was carried out for each of the 17 situations. Within each situation, subjects were alternately assigned to one of two sub-groups. The mean rating assigned to each of the musical characteristics was calculated within each sub-group, and a product-moment correlation was calculated between the two sets of ratings obtained for each situation. All the resulting coefficients ranged between +0.79 and +0.95, with the exception of that for the proposed situation 'You have just broken up with a boyfriend/girlfriend', which produced a coefficient of +0.66. All coefficients were significant at $p < 0.01$ ($N = 27$), which means that subjects' responses appeared to be consistent within the proposed situations.

Interaction of musical characteristics and situations A 17 x 27 mixed ANOVA was carried out to determine whether subjects' ratings demonstrated an interaction between the situations and musical characteristics. The main effect for the proposed situation was not significant ($F = 1.55$, d.f. = 16, 362). However, the main effect for the musical characteristics was significant ($F = 75.49$, d.f. = 26, 9412, $p < 0.001$), as was the interaction between this factor and the proposed situations ($F = 8.66$, d.f. = 416, 9412, $p < 0.001$). The mean ratings for each situation x musical characteristic combination

are presented in Table 10.1, in which the 17 proposed situations are numbered as in the 'Design' section above.

To further investigate the extent of situational differences in ratings of the musical characteristics, a series of one-way independent subjects ANOVAs was carried out between the 17 situations for ratings of each of the 27 musical characteristics. A significant main effect was found for all but one of the 27 musical characteristics in Table 10.1. With the exception of 'strong ethnic roots', values of F ranged between 2.47 and 23.01 (d.f. = 16, 376, $p < 0.01$ in all cases). The main effect for 'strong ethnic roots' only approached statistical significance ($F = 1.64$, d.f. = 16, 376, $p = 0.06$). For each musical characteristic, Tukey HSD tests were carried out between each possible pairing of the 17 situations (i.e. 136 tests per musical characteristic). This led to 3672 tests in all, of which 819 were significant. Table 10.2 presents the number of pairs of situations which differed significantly for each musical characteristic. These are not specified in further detail, since the aim of the present research is simply to demonstrate a number of significant differences between the situations for each of the musical characteristics investigated.

These differences between the proposed situations were investigated further by correlational analyses. The mean rating for each of the 27 musical characteristics was calculated within each proposed situation. Product-moment correlations were calculated between these mean ratings for each possible pairing of the 17 situations: this led to 136 correlations being calculated. 77 of the resulting coefficients were greater than or equal to +0.30, whilst the remaining 59 were between +0.29 and -0.53 with 30 of these values being negative ($N = 27$ in all cases). This indicates that whilst positive relationships maintained between the reported musical preferences for certain pairs of situations, the relationships for other pairs were often negligible or even inverse. This further indicates that subjects' ratings of the musical characteristics varied considerably between the 17 proposed situations.

Factors underlying the musical characteristics A factor analysis was carried out to investigate the dimensions underlying ratings assigned to the 27 musical characteristics. Varimax rotation of the principal components solution yielded 6 factors with eigenvalues greater than one, which accounted for 61.5% of the variance. Factor loadings greater than +/-0.30 are presented in Table 10.3.

The characteristics 'Loud', 'Strong rhythm', 'Invigorating', 'Can dance vigorously to it', 'Attention-grabbing', 'Exciting/Festive', and 'Pop music' loaded positively on Factor 1,

	Situations																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Familiar	7.64	7.17	8.41	7.75	7.29	5.91	4.36	6.30	6.96	8.25	6.71	7.17	7.92	6.23	6.29	6.30	8.04
Sad	1.55	0.61	1.08	1.83	1.96	2.55	1.82	1.70	4.54	0.58	1.96	2.26	2.75	1.82	2.08	3.60	2.33
Strong rhythm	7.59	8.43	8.29	7.50	6.96	4.64	3.23	4.13	4.75	4.71	3.92	3.91	2.71	4.14	3.17	4.35	7.13
Attention-grabbing	6.27	7.61	6.13	6.54	6.75	4.00	2.82	3.87	4.75	4.33	3.71	5.22	2.29	1.41	2.42	5.00	4.92
Can dance vigorously to it	7.32	8.22	6.46	5.21	4.13	2.50	1.64	2.35	2.79	3.79	1.79	2.48	0.71	1.32	1.17	1.65	3.92
Happy	8.09	7.35	7.92	7.58	7.75	6.82	6.68	7.09	5.75	8.79	7.63	7.52	6.67	6.36	6.29	5.60	7.46
Jazz music	2.59	4.09	3.17	3.29	3.54	2.64	5.05	6.17	4.54	2.83	4.58	3.65	3.33	4.05	5.00	2.85	4.17
Pop music	5.32	6.22	6.75	6.00	6.92	4.27	3.73	3.61	4.63	5.33	5.67	5.91	3.63	3.23	3.00	1.65	5.79
Classical music	1.27	0.78	2.75	3.50	4.54	5.73	6.91	5.74	4.21	4.71	5.17	4.04	5.21	5.09	5.21	5.80	4.42
Sensual	4.68	5.57	2.58	3.88	4.83	6.05	7.64	6.30	5.08	3.58	2.96	5.91	7.50	8.59	8.21	5.85	4.38
Lilting	3.14	3.17	2.71	3.71	4.26	5.55	5.71	5.30	4.83	3.83	4.33	4.87	6.30	5.38	5.83	4.89	4.17
Beautiful	3.50	3.78	3.83	4.96	4.92	8.06	7.82	6.65	5.38	6.04	6.63	6.04	7.42	7.45	6.38	7.80	5.71
Natural/Fresh	4.41	4.45	5.08	5.21	5.29	7.50	6.18	6.57	4.46	4.71	6.33	6.57	6.35	5.91	5.58	6.80	5.75
Expresses profound emotions	3.82	5.09	3.33	4.50	5.58	6.95	5.36	4.04	5.50	5.00	5.04	5.78	5.04	7.36	5.88	8.35	6.42
Sentimental	4.82	3.13	2.63	4.25	3.75	5.91	5.14	4.52	5.71	6.00	5.75	4.78	5.96	6.59	5.71	6.10	4.42
Nostalgic	5.55	3.48	3.83	5.13	4.54	5.86	5.14	5.00	5.83	6.75	5.46	5.39	6.17	3.95	5.04	5.25	5.00
Sophisticated/Classy	4.23	3.78	2.42	3.17	7.83	3.59	7.59	7.26	3.67	3.96	5.63	3.43	4.21	3.55	4.96	3.85	4.96
Strong ethnic roots	3.77	4.13	3.25	3.33	4.13	3.59	5.41	3.35	3.50	2.08	3.33	3.39	3.71	3.09	2.75	3.55	3.67
Exotic	3.45	4.43	3.17	3.63	3.67	3.77	5.23	4.35	3.17	1.58	3.00	3.00	4.08	4.82	4.58	2.35	3.92
Quiet	2.36	0.61	0.38	1.71	2.33	5.36	7.50	5.78	4.67	4.83	6.92	5.61	7.96	6.77	6.58	4.20	3.04
Loud	7.50	8.04	7.71	7.79	7.13	4.00	1.05	3.00	5.46	4.33	2.29	3.83	1.96	2.68	2.04	5.45	7.46
Romantic	4.18	4.35	2.75	5.08	4.58	6.14	7.82	5.74	3.83	3.88	3.92	4.74	6.75	7.77	8.00	4.20	4.63
Moody	3.36	3.00	3.33	3.79	4.29	5.64	5.86	4.65	6.33	2.75	3.13	4.96	4.46	5.41	4.04	5.40	5.54
Inspiring/Majestic	3.95	4.52	5.96	5.46	5.63	6.86	4.45	4.52	6.17	4.75	4.17	4.91	5.00	5.91	4.17	7.80	6.25
Relaxing/Peaceful	3.05	2.13	2.50	4.46	4.46	7.23	7.41	6.35	5.75	6.00	6.74	6.96	9.13	6.68	7.08	6.65	5.08
Invigorating	8.73	8.78	9.17	8.21	7.54	6.91	3.77	5.17	4.75	6.54	5.33	5.48	2.46	5.36	3.58	6.25	7.54
Exciting/Festive	8.55	7.73	7.33	7.67	6.83	5.18	3.68	4.96	3.17	8.33	5.42	4.48	2.17	3.91	2.71	6.00	6.13

Table 10.1 - Mean ratings of the importance of 27 musical characteristics over 17 different situations

Musical Characteristic	Number of pairs of situations which differed significantly	Musical characteristic	Number of pairs of situations which differed significantly
Familiar	13	Sentimental	17
Sad	18	Nostalgic	4
Strong rhythm	63	Sophisticated/Classy	2
Attention-grabbing	47	Strong ethnic roots	2
Can dance vigorously to it	62	Exotic	9
Happy	14	Quiet	70
Jazz music	7	Loud	69
Pop music	31	Romantic	39
Classical music	31	Moody	11
Sensual	51	Inspiring/Majestic	12
Lilting	13	Relaxing/Peaceful	49
Beautiful	38	Invigorating	61
Natural/Fresh	5	Exciting/Festive	60
Expresses profound emotions	21		

Table 10.2 - Number of significant Tukey tests between the 17 situations for each musical characteristic

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Positive loading musical characteristics	Loud (+0.87) Strong rhythm (+0.84) Invigorating (+0.80) Can dance vigorously to it (+0.79) Attention-grabbing (+0.75) Exciting/Festive (+0.71) Pop music (+0.35)	Sensual (+0.77) Romantic (+0.67) Exotic (+0.60) Lilting (+0.51) Strong ethnic roots (+0.35) Beautiful (+0.33)	Sad (+0.78) Moody (+0.67) Expresses profound emotion (+0.45)	Inspiring/Majestic (+0.73) Natural/Fresh (+0.66) Expresses profound emotion (+0.53) Beautiful (+0.51) Relaxing/Peaceful (+0.40)	Nostalgic (+0.75) Sentimental (+0.72) Pop music (+0.41) Familiar (+0.39) Romantic (+0.37)	Sophisticated/Classy (+0.69) Jazz music (+0.68) Strong ethnic roots (+0.45) Classical music (+0.42) Exotic (+0.31)
Negative loading musical characteristics	Quiet (-0.83) Relaxing/Peaceful (-0.67) Classical music (-0.48) Beautiful (-0.44) Lilting (-0.35)	Happy (-0.75) Exciting/Festive (-0.35) Pop music (-0.32)	Strong ethnic roots (-0.33)			
Eigenvalue	7.57	2.78	2.15	1.68	1.30	1.14
% of variance	28.0	10.3	8.0	6.2	4.8	4.2

Table 10.3 - Factor analysis of musical characteristics across 17 situations (Only loadings greater than +/-0.30 are reported).

and 'Quiet', 'Relaxing/Peaceful', 'Classical music', 'Beautiful', and 'Lilting' loaded negatively on this factor. The positive loading characteristics are those that might reasonably be perceived as arousing, and negative loading characteristics are those that might reasonably be perceived as relatively pacifying so that Factor 1 could be interpreted as representing 'Arousal'. 'Sensual', 'Romantic', 'Exotic', 'Lilting', 'Strong ethnic roots', and 'Beautiful' all loaded positively on Factor 2. These characteristics possess erotic or amorous aspects, so that Factor 2 could be interpreted as representing 'Sensuality'. The characteristics 'Sad', 'Moody', and 'Expresses profound emotions' loaded positively on Factor 3, and 'Happy', 'Exciting/Festive', and 'Pop music' loaded negatively on this factor. The positive loading characteristics represent a brooding quality and the negative loading characteristics express a relatively carefree nature, so that Factor 3 could be described as 'Melancholia'. Positive loadings on Factor 4 were obtained for 'Inspiring/Majestic', 'Natural/Fresh', 'Expresses profound emotions', 'Beautiful', and 'Relaxing/Peaceful'. These characteristics represent rather ethereal qualities, so that Factor 4 could be interpreted as representing 'Spirituality'. The characteristics 'Nostalgic', 'Sentimental', 'Pop music', 'Familiar', and 'Romantic' loaded positively on Factor 5, whilst the characteristic 'Strong ethnic roots' loaded negatively on this factor. The positive loading characteristics all possess a cosy or comfortable aspect, so that Factor 5 could be described as 'Homeliness'. Positive loadings on Factor 6 were obtained for 'Sophisticated/Classy', 'Jazz music', 'Strong ethnic roots', 'Classical music', and 'Exotic'. All these musical characteristics represent refined or cultured qualities, so that Factor 6 could be interpreted as representing 'Sophistication'.

Factors underlying the situations A second factor analysis was carried out to investigate the dimensions underlying ratings assigned between the 17 proposed situations. Varimax rotation of the principal components solution yielded four factors with eigenvalues greater than one, which accounted for 50.4% of the variance. Factor loadings greater than +/-0.30 are presented in Table 10.4.

Several situations loaded positively on Factor 1. In descending order of factor loading these were 'You are jogging with your Walkman on', 'You are at a nightclub', 'You are at an end of term party with friends', 'You are doing the washing-up', 'You are ironing some clothes', 'You are driving on the motorway', and 'It is Christmas Day and you are with your family'. Factor 1 might thus be described as 'Activity'. The second main factor yielded by the analysis was represented by positive loadings for 'You are trying to woo someone over a romantic candlelit dinner for two at home', 'You are in a restaurant', 'It is first thing on a Sunday morning', 'It is last thing at night and you are

	Factor 1	Factor 2	Factor 3	Factor 4
Positive loading situations	You are jogging with your Walkman on (+0.75) You are at a nightclub (+0.72) You are at an end of term party with friends (+0.69) You are doing the washing-up (+0.67) You are ironing some clothes (+0.65) You are driving on the motorway (+0.49) It is Christmas Day and you are with your family (+0.47)	You are trying to woo someone over a romantic candlelit dinner for two at home (+0.69) You are in a restaurant (+0.66) It is first thing on a Sunday morning (+0.64) It is last thing at night and you are about to go to bed (+0.61) You are making love (+0.60) Your parents have come to visit (+0.49) You are at a posh cocktail reception (+0.42)	You are in church (+0.81) You are in the countryside (+0.57) You are driving on the motorway (+0.46) It is Christmas Day and you are with your family (+0.45)	You have just broken up with a boyfriend/girlfriend (+0.81)
Negative loading situations				You are at a posh cocktail reception (-0.51)
Eigenvalue	3.32	3.06	1.14	1.04
% of variance	19.5	18.0	6.7	6.1

Table 10.4 - Factor analysis of 17 music listening situations (Only loadings greater than +/-0.30 are reported).

about to go to bed', 'You are making love', 'Your parents have come to visit', and 'You are at a posh cocktail reception'. The situations which load on Factor 2 are all of a socially immediate and small-scale nature, and are associated with quietness. These situations seem to indicate that Factor 2 could be described as 'Localised subdued behaviour'. The analysis also yielded two much weaker factors (eigenvalues = 1.14 and 1.04 respectively). Four situations loaded positively on Factor 3, namely 'You are in church', 'You are in the countryside', 'You are driving on the motorway', and 'It is Christmas Day and you are with your family'. This factor is difficult to interpret, although a label such as 'Spirituality/Serenity' might be most appropriate given the highest loadings on this factor from 'You are in church' and 'You are in the countryside': the situations that load on this factor might be seen as serene and majestic, and of a general nature. Only two situations loaded on Factor 4. 'You have just broken up with a boyfriend/girlfriend' loaded positively, and 'You are at a posh cocktail reception' loaded negatively. This small number of situations makes Factor 4 difficult to interpret accurately, although 'Social constraint' is at least one possible label.

Discussion

Reported musical preferences varied across 17 different hypothetical listening situations. A two-way ANOVA showed that subjects' ratings involved an interaction between the hypothetical situation with which they were presented and ratings of the musical characteristics: the importance of given musical characteristics varied with the hypothetical situations in which that music would be heard. One-way ANOVAs showed that this effect occurred to varying degrees for all but one of the 27 musical characteristics considered. Subsequent correlational analyses corroborated these findings by demonstrating several negligible or even negative correlations between the music that subjects reported they would prefer across different proposed situations. However, although a large number of significant differences were found in ratings assigned *between* the 17 proposed situations, split-half reliability analyses indicated a high level of consensus *within* the ratings assigned to each proposed situation. Therefore, ratings were consistent within, but clearly varied between the proposed listening situations.

Two factors analyses investigated the dimensions underlying subjects' responses to the musical characteristics and hypothetical situations. The factor analysis of ratings assigned to the musical characteristics yielded 6 factors that might be labelled as 'Arousal', 'Sensuality', 'Melancholia', 'Spirituality', 'Homeliness' and 'Sophistication'. A

further factor analysis of the 17 proposed situations was carried out to identify which aspects of those situations were associated with similar ratings of the musical characteristics. This yielded two main factors that might be labelled as 'Activity' and 'Localised subdued behaviour', and this subdued element contrasts with Factor 1. Two weaker factors identified might be interpreted more cautiously as 'Spirituality/Serenity' and 'Social constraint'. The factors yielded by these two analyses effectively represent the musical and situational features that were salient in the effects of the hypothetical listening situation on subjects' reported musical preferences. Given this, it is interesting that the most important factors yielded by the two analyses were 'Arousal' and 'Activity' respectively: these seem to be consistent with Konecni's research, which showed arousal to be an important aspect of the relationship between music and the listening environment.

However, it is interesting to consider the much more speculative evidence provided by Table 10.1 concerning the possible role of arousal-based factors in subjects' ratings. Konecni concluded that music was selected to *moderate* the arousal-evoked by the listening situation (see Chapter 7): the present results suggest that music may sometimes be selected so as to instead *polarise* this arousal. For example, situations that seem to be arousing in nature (e.g. 'You are jogging with your Walkman on', 'You are at an end-of-term party with friends') seem to be associated with a preference for musical characteristics that should further increase arousal (e.g. 'Invigorating', 'Exciting/Festive', 'Loud'). In contrast, ratings assigned to situations that might be seen as representing a low degree of arousal (e.g. 'It is last thing at night and you are about to go to bed') seem to demonstrate a preference for musical characteristics that would further reduce arousal (e.g. 'Relaxing/Peaceful', 'Lilting', 'Quiet').

Several other examples of this type may be found in Table 10.1, and although highly speculative, the notion of music as a means of arousal polarisation seems to make intuitive sense. For example, when jogging we *want* to achieve a state of high arousal, and select music that would have arousal-increasing properties: music that has a moderating effect on arousal would only impede our efforts to achieve this highly-aroused state. Moreover, such a process could also correspond with the preference for prototypes model: by selecting music that corresponds with the listening situation, we supplement musical cues for category activation with situational ones, and this might well lead to a more positive response to the music.

In conclusion, the results of this initial exploratory study indicate that reported musical preferences vary in a consensual manner over a range of listening situations,

and a reasonably small number of factors seem to underlie this. The results also provide an initial suggestion that rather than selecting music which would moderate their level of arousal, subjects' seemed to sometimes prefer music that might *polarise* this. These ideas were tested more formally by a study reported in the following chapter.

Chapter 11. Musical Preferences When Relaxing and Exercising

The previous study provided an initial indication that responses to music might vary between different listening situations, and that the nature of these variations might indicate an attempt to *polarise* arousal rather than *moderate* it. More simply, in hypothetical situations that would be arousing (e.g. at a nightclub, whilst jogging) subjects reported that they would want to hear music with arousing qualities (e.g. loud, invigorating): in hypothetical situations that would be relatively unarousing (e.g. immediately before going to bed), subjects reported that they would want to hear music with similarly unarousing qualities (e.g. relaxing/peaceful, quiet).

However, by virtue of the survey approach taken in the study it was difficult to be confident about the validity of this arousal polarisation process, and so it seems advisable to investigate this experimentally by asking subjects to listen to actual pieces of music in actual listening situations. As such, the present study follows directly from the previous one, and attempts to test two of its speculative findings. The first of these is that responses to the same musical characteristics should vary between two situations such that one piece will be liked in one situation but disliked in a second, whilst a second piece will be disliked in the first situation and liked in the second. The second hypothesis is that subjects should sometimes select music that will polarise their level of arousal rather than moderate it.

This research also attempts to experimentally mimic two of the situations from the previous study. To correspond with a presumably unarousing hypothetical situation from the previous study ('It is last thing at night and about to go to bed' - Situation 13), subjects in the present study were asked to relax for a short period: to correspond with a presumably arousing hypothetical situation from the previous study ('You are jogging with your Walkman on' - Situation 3), a second group of subjects in the present study were asked to exercise for a short period. These two experimental situations seem to possess reasonable face validity as everyday music listening contexts. However, it should be emphasised that the relaxing and exercising tasks were both carried out in the laboratory rather than the field. This represents a compromise between experimental control and a more naturalistic approach, but was necessary in order to control the listening situations and to reliably measure the subjects' actual listening behaviour in relation to actual musical pieces.

In light of these issues, the present study investigated a simple question: what should happen in the two experimental listening situations when the typical/appropriate

musical selection is one that further polarises rather than moderates arousal ? Should listeners choose the inappropriate, untypical music that moderates their level of arousal, or should they prefer to hear the appropriate, arousal-polarising music ? The preference-for-prototypes model suggests that they should select the typical/ appropriate music, whereas Berlyne's theory and Konecni's research suggests that they should select the arousal-moderating music.

Whilst either relaxing or exercising, subjects could listen to a piece of either high (HA) or low (LA) arousal potential, and an Operant Music Listening Recorder (see Chapter 2) timed how long subjects listened to each. At the end of the session subjects rated their liking for the two pieces, and the appropriateness of these for the task. Measures of pulse and verbal ratings were also taken to check that the two tasks and types of music brought about differing levels of arousal. On the assumption that HA music should be rated by subjects as more appropriate for exercising, whereas LA music should be rated by subjects as more appropriate for relaxing, the preference-for-prototypes model predicts that subjects in the exercise condition should spend longer listening to the HA music and assign higher liking ratings to it than they should to the LA music: subjects in the relaxation condition should spend longer listening to the LA music and assign higher liking ratings to it than they should to the HA music. That is, pleasure should be maximised by a category-activation process. In contrast, Berlyne's theory in conjunction with Konecni's research predicts the opposite effect, namely that subjects in the exercise and relaxation conditions should be more favourably disposed toward the LA and HA music respectively, since pleasure should be maximised through an arousal-moderation process. The study also allows investigation of two other features of subjects' responses. The first is the degree of correlation between ratings of musical preference and the behavioural measure of listening time, which may or may not give rise to similar results. Second, the data also allows the investigation of possible patterns in the ways that subjects might switch between the two types of music available. This might provide some initial insight into how people structure their music listening experiences (see also Breckler, Allen, and Konecni, 1985).

Method

Subjects 48 first-year psychology undergraduates volunteered for the study as part of their course requirement. All were between 18 and 25 years old (mean age = 19.27 years, s.d. = 2.06), and comprised an equal number of males and females. To provide further information on the sample, a panel of three independent judges assessed a self-

report of musical training and experience made by subjects, and determined that 10, 9, and 5 subjects in the relaxation condition possessed low, intermediate, and high levels respectively, with the corresponding figures for the exercise condition being 10, 11, and 3 respectively.

Stimuli and apparatus As in Chapter 2, although in the case of the present study, only the LA and HA versions of the two pieces were employed.

Design A mixed design was employed in which participants were allocated randomly to either the exercise or the relaxation condition, before responding to both LA and HA music. An equal number of males and females was assigned to each condition. Only one of the two pieces was employed in each session, and the use of these two pieces was counterbalanced between the conditions and also between subject genders within each condition.

Procedure On entering the sound proof laboratory, subjects were seated in front of the tape recorder, and were asked to put on the headphones and the pulse meter. After one minute, the subjects were asked to listen to the initial 90 seconds of both versions of the piece in use. This served two purposes: to allow the experimenter to take the subject's pulse at the end of each 90-second excerpt (so as to measure the arousal level evoked by each version), and to allow the experimenter to point out that the only way in which the two versions varied was in their tempo and volume, so that the two versions were otherwise identical. The presentation order of the 90-second excerpts was fully counterbalanced.

When the subject had understood that the two versions were identical but for their tempo and volume, the experimenter read the experimental instructions from a printed sheet. In the relaxation condition, subjects were told that they would shortly be asked to lie down on 8 quilts that were piled on top of one another on the floor, and to try to relax as much as possible. They were also told that they should close their eyes, clear their minds, and breath slowly and deeply when doing this. Two pillows were provided. Subjects were told that after two minutes of relaxing on the quilts they would begin to hear one of the two versions of the music with which they had just been presented. It was stressed that they were free to listen to whichever of the two versions they wanted to. Subjects were told that they could change to the other version at any time and as often as they chose simply by saying 'change', at which the experimenter would press the appropriate button on the OMLR. Although this means of changing between the versions introduced a delay of approximately 1 second into

the measures of listening time for each version, the technique seems acceptable since the overall differences obtained on this measure are gross.

Subjects were then asked to make themselves comfortable on the quilt, and to remove their shoes and any other clothing that might make them feel uncomfortable. The experimenter fitted the pulse meter before pulling down a window blind, and sitting down on a floor-level cushion with a finger on each of the two OMLR buttons. Subjects were asked to state which of the two versions they would like to start with, before beginning the initial two minutes of relaxation. After this period had elapsed, the experimenter recorded the subject's pulse rate before starting the music and the OMLR, which recorded subjects' musical selections over the following 5 minutes.

Afterwards, subjects were told that they would be rating each version in terms of how much they liked it, how relaxing versus arousing it was, and how appropriate it was (which was further defined as the extent to which it was 'typical of the kind of music you have heard and have perhaps heard others listening to whilst trying to relax'). These ratings were given on 0-10 scales where 0 represents the low and 10 the high extremes. Subjects were played a 15-second reminder excerpt before rating each version since these were only identified to subjects throughout the experiment as 'this version' or 'that version'. The order in which the two versions were rated was fully counterbalanced. Subjects were asked to make their ratings in terms of how they felt about each piece whilst trying to relax. Once each version had been rated, subjects rated how 'relaxing versus arousing' they found lying on the quilts on the same scale as for the musical ratings.

An equivalent methodology was employed in the exercise condition, with one minor adaptation because of the nature of the task. After being introduced to the two versions of each piece, subjects were told that they would be asked to ride an exercise bike at 50 rpm. (This speed was based on earlier pilot testing.) They were told that the only grounds for not riding at this pace were if physical difficulties arose (for example pains in the chest, breathing difficulties etc.), and it was stressed that if subjects felt unwell at any stage then they must stop immediately. The experimenter ensured that subjects knew of no medical problems that might prevent them from participating, and it was stressed that if in any doubt whatsoever they could withdraw from the experiment whilst still receiving full credit for having taken part. Subjects were offered a clean t-shirt to change into before beginning their exercise. The wording of the rating scales employed at the end of the session was also changed accordingly.

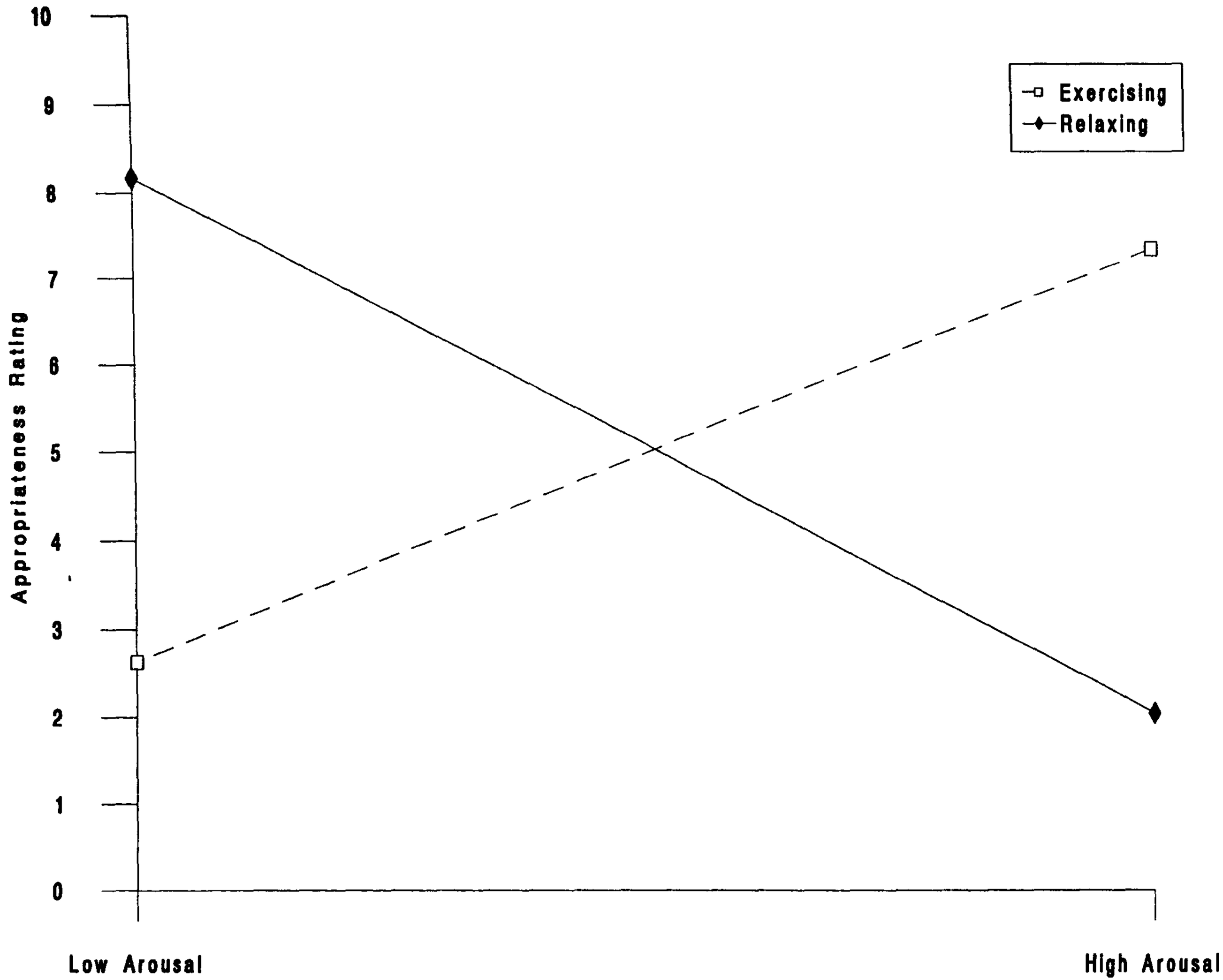
Results

An independent t-test was carried out on each of the 7 dependent variables to determine whether there were any differences in responses to the two pieces of music employed in the study. None of these analyses produced a significant difference, with values of t ranging between 0.09 and 1.41 (d.f. = 47 in all cases). Responses to the two pieces appear to be similar, and so they are treated as equivalent in the following analyses.

Manipulation checks Repeated measures t-tests were carried out between the LA and HA versions on subjects' ratings of how arousing they were, and also on subjects' pulse rate after listening to the 90-second excerpt of each version at the start of the experiment. The results of these were $t = 12.66$, d.f. = 47, $p < 0.001$; and $t = 10.36$, d.f. = 47, $p < 0.001$ respectively. The mean ratings and pulse rates were 2.52 and 81.46, and 7.85 and 88.85 for the LA and HA versions respectively. In addition to the musical differences between the versions in terms of tempo and volume, these results provide psychological and physiological evidence that what was termed HA music was significantly more arousing than what was termed LA music. Two independent t-tests were carried out between the two conditions to investigate differences in subjects' ratings of how arousing the task was, and also their pulse rate after two minutes of the task without music. The mean ratings and pulse rates were 2.33 and 76.46, and 7.83 and 138.75 for the relaxation and exercise conditions respectively. These results provide psychological and physiological evidence that the exercise condition was more arousing than the relaxation condition. A 2 (relaxation versus exercise) x 2 (LA versus HA music) mixed ANOVA was carried out to investigate subjects' ratings of the appropriateness of the two types of music in each condition. There were no significant main effects of either experimental condition ($F = 0.14$, d.f. = 1, 46) or type of music ($F = 3.38$, d.f. = 1, 46), although there was a highly significant interaction between these two factors ($F = 197.76$, d.f. = 1, 46, $p < 0.001$), which is plotted in Figure 11.1.

These results confirm the basic assertion that in each condition, one type of music should be perceived as more appropriate whilst the other type should moderate subjects' level of arousal, and that the appropriate and arousal-moderating pieces should differ between the two conditions in this respect. That is, in the relaxation condition, LA music was perceived as more appropriate whilst the HA music should moderate arousal: in the exercise condition, HA music was perceived as more appropriate whilst LA music should moderate arousal.

Figure 11.1 - Rated Appropriateness of Low and High Arousal Music When Exercising or Relaxing



Listening time A 2 (relaxation versus exercise) x 2 (LA versus HA music) mixed ANOVA was carried out to investigate the amount of time that subjects spent listening to the two types of music in each condition. There was no significant main effect for the type of music ($F = 0.03$, d.f. = 1, 46) or for the condition in which the music was heard ($F = 0.02$, d.f. = 1, 46) although the latter finding is entirely expected since subjects were required to spend 5 minutes listening to the music in each condition. (This latter F ratio did not equal absolute 0 because the OMLR required 1 millisecond to switch channels). However, there was a highly significant condition x type of music interaction ($F = 85.58$, d.f. = 1, 46, $p < 0.001$), the means for which are plotted in Figure 11.2.

Rated liking for the music A 2 (relaxation versus exercise) x 2 (LA versus HA music) mixed ANOVA was carried out to investigate subjects' ratings of liking for the two types of music in each condition. There was no significant main effect for the type of music ($F = 2.20$, d.f. = 1, 46) or for the condition in which the music was heard ($F = 0.02$, d.f. = 1, 46). However, there was a highly significant condition x type of music interaction ($F = 63.25$, d.f. = 1, 46, $p < 0.001$), the means for which are plotted in Figure 11.3.

Two further analyses were carried out on the data. Separate product-moment correlations were calculated for the LA and HA versions respectively to determine the relationship between listening time and liking ratings. The resulting values ($r = +0.67$ and $+0.74$ respectively, $N = 48$, $p < 0.001$ in both cases), indicated that these verbal and behavioural measures of preference were positively related to one another. Finally, the frequency with which subjects changed between the two versions was calculated. 11 subjects did not change at all, 8 changed once, 18 changed twice, four changed three times, 6 changed four times, and one changed 5 times.

Discussion

This study investigated two measures of musical preference, namely verbal ratings and listening time. These measures of preference were positively correlated (see also Chapter 2), and were both subject to an interaction between the arousal level of the music (LA or HA) and the situation in which these were experienced (i.e. when exercising or relaxing). That is, when subjects were exercising they preferred HA music, whereas when subjects were relaxing they preferred LA music, and this indicates that musical preference does vary with the listening situation. Moreover, the

Figure 11.2 - Time Spent Listening to Low and High Arousal Music When Exercising or Relaxing

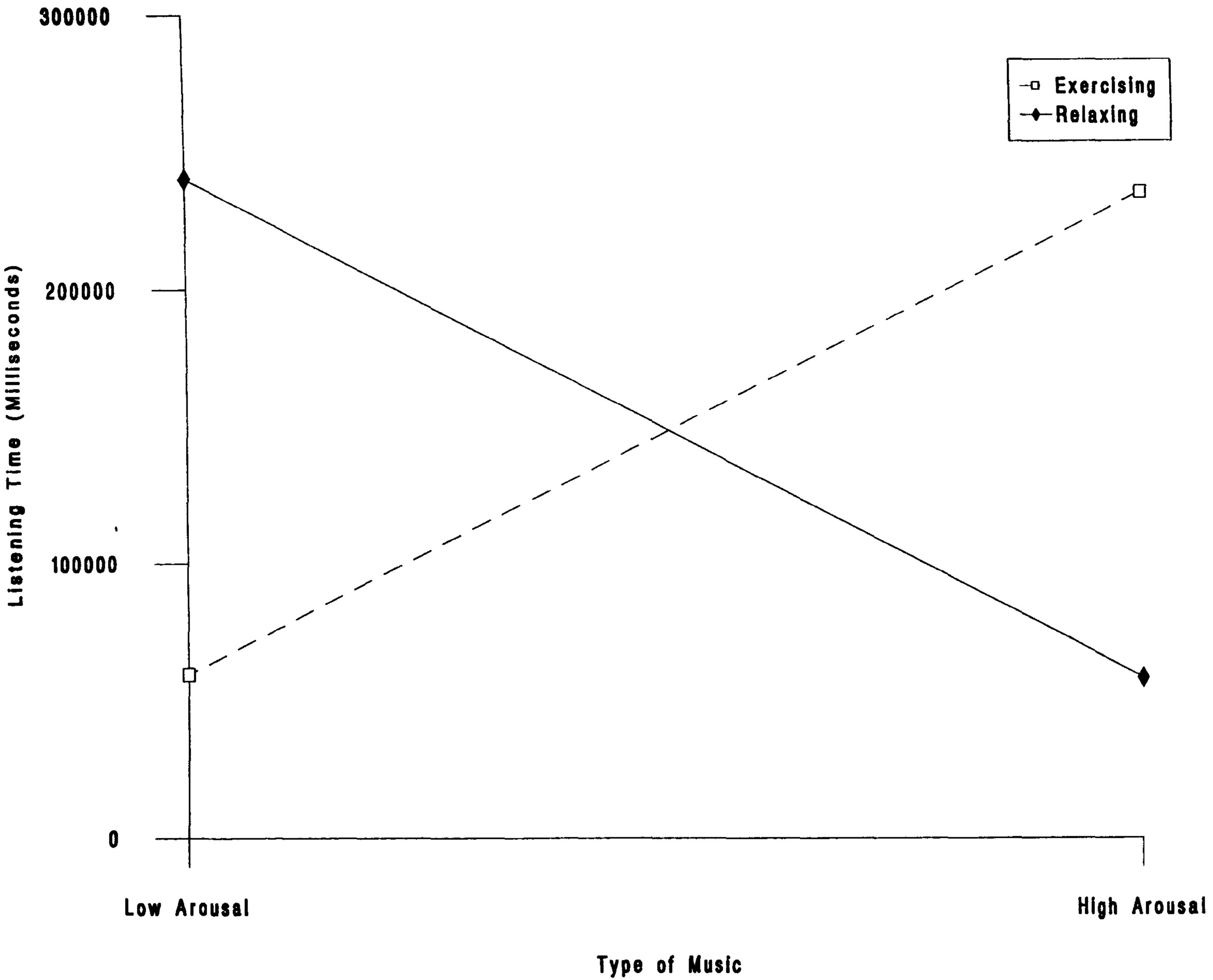
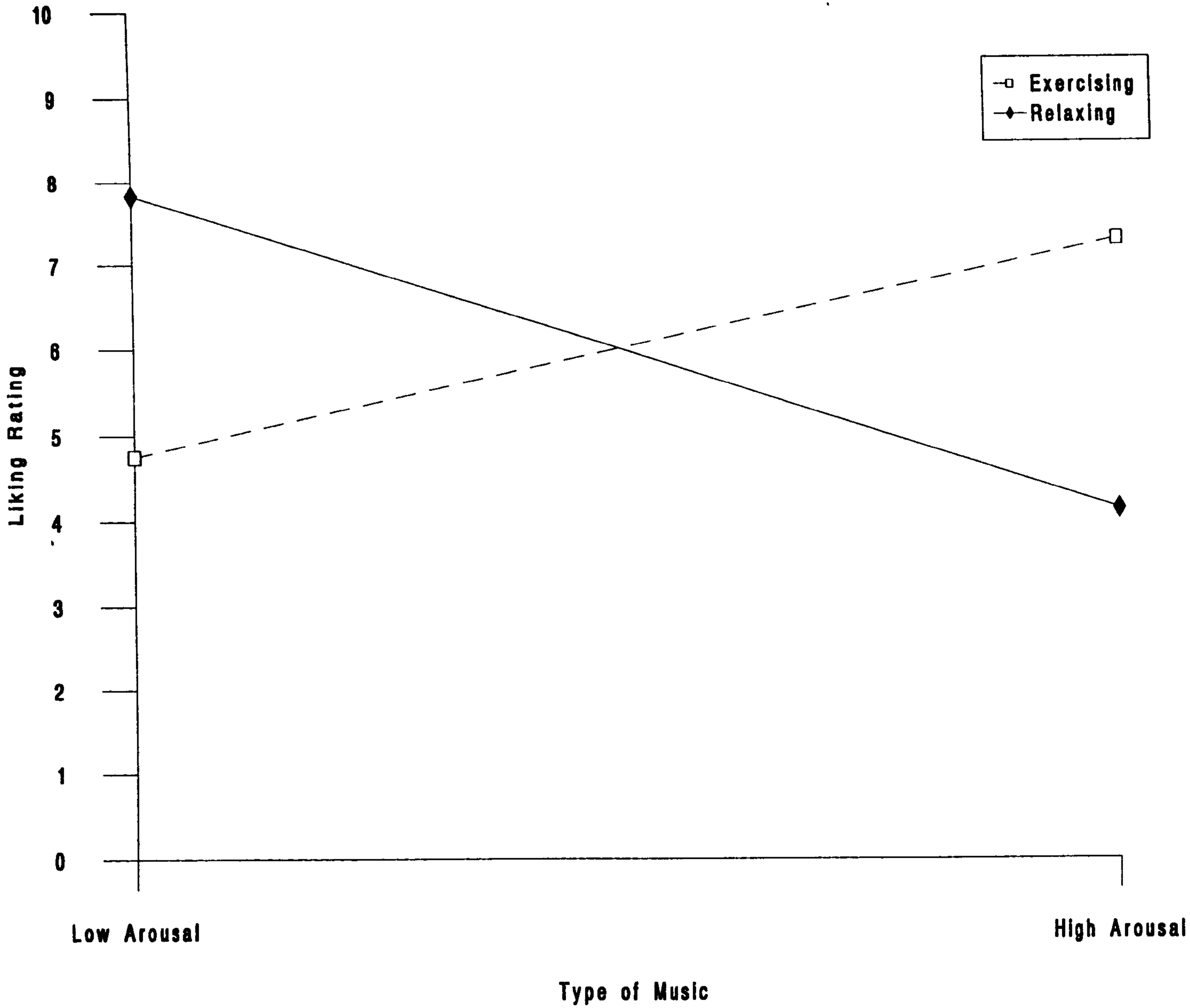


Figure 11.3 - Rated Liking for Low and High Arousal Music When Exercising or Relaxing



nature of these preferences, in conjunction with the manipulation checks above, indicate that subjects preferred music that was perceived as appropriate for the listening situation, and that this overcame any influence on preferences attributable to an arousal-moderation process. In short, musical preferences were influenced by the situations in which that music was experienced, and the nature of these preferences indicates that subjects' musical selections represented an attempt to optimise their responses to the situation (e.g. relaxing them when they were trying to relax, or arousing them when they tried to attain a highly aroused state).

This suggests that preferred levels of aesthetically-evoked arousal are context- and typicality-dependent, so that it may be wrong to argue that moderately arousing music is always liked most. In more commonplace music listening situations, other factors such as appropriateness mediate the relationship between arousal and liking, and can lead to preference for stimuli with arousal-polarising qualities. These results also correspond with earlier research on the preference-for-prototypes model which suggests that preference for typical stimuli can outweigh preference for arousal-moderating stimuli.

This raises the question of the precise nature of the relationship between musically-evoked arousal levels, the typicality/appropriateness of music, and the characteristics of the music listening situation. Konecni's studies demonstrated that subjects tended to select music that would moderate their level of arousal in the listening situation. How can the present results be reconciled with those obtained by Konecni, since the former support a typicality-based explanation whereas the latter suggest that an arousal-based approach may be more useful ? There may be three ways in which arousal- and typicality-based explanations can be reconciled: these concern the interpretation of the present findings in the light of Konecni's more general conclusions, the influence of subjects' goals in a given situation, and the notion that typical levels of musical arousal potential may exist for a given situation.

First, rather than contradicting Konecni's findings, the present findings correspond with his general argument that people's music selections in an everyday situation are those that optimise mood and responses to that situation. Rather, the present results show that musical selection as a means of mood optimisation may not always equate with musical selection as a means of arousal moderation, and there is a great deal of anecdotal evidence to support this view. For example, if we always preferred music that would moderate our level of arousal, then why should we listen to loud, fast music at parties and nightclubs ?

Second, subjects in Konecni's studies were not instructed to attempt to achieve any given level of arousal, whereas subjects were directly instructed to do this in the present study. Given this difference, it seems that subjects' motivations may mediate the *nature of* the relationship between situationally- and musically-evoked arousal. In the absence of direct motives or when polarised arousal is undesired, as in Konecni's studies, subjects perhaps revert to an arousal-moderation process. However, when subjects are motivated to achieve a given polarised arousal state (such as relaxation or exercise), then they select music that should help them achieve their goal of arousal polarisation. In both cases, musical preferences interact with the listening situation, and the arousal-evoking qualities of the music and the situation are both relevant parameters: it may well be that in Konecni's studies non-goal states led to music being selected to *moderate* arousal, whilst goal states led to appropriate music being selected to *polarise* arousal in the present research. Such a process may link with reversal theory (e.g. Apter, 1984) which states that preferred levels of arousal generally depend on whether subjects are in an arousal-reducing ('telic') or arousal-seeking ('paratelic') mode.

For the time being, it seems reasonable to assume that certain everyday listening situations are subject to an arousal-state goal such that musical selections reflect an attempt to polarise arousal: this could explain, for example, why we listen to lively music at parties. Other everyday situations may not be subject to an arousal-state goal, or may cause undesirably polarised arousal levels, and so people in these situations might be expected to select music that should moderate their level of arousal. The important point seems not to be that we always use music to *moderate* our level of arousal, but that we use appropriate music to achieve a *desired level* of arousal which in any given situation may be low, high, or moderate: the arousal-state goal is crucial in mediating preference, and this corresponds with Konecni's argument that musical selections represent an attempt to optimise our responses to the situation.

This leads to a third argument, namely that it may be incorrect to contrast typicality- and arousal-based explanations of musical preference, as in previous research in experimental aesthetics (see Chapter 1). It may instead be more useful to consider typical levels *of* musical arousal for a given context and goal: perhaps a piece of music becomes typical and appropriate because it is played frequently in a given context, with the goal of promoting a given level of arousal. Typical levels of musical arousal potential may not always equate with music that will moderate subjects' level of arousal, as the present results demonstrate, but it is possible to say that certain levels

of musical arousal potential are more typical and appropriate for certain listening situations. Such an argument obviously corresponds with those raised in Chapters 6 and 9 in suggesting that arousal-based factors may partly explain typicality effects on musical preference such that typical music promotes a certain level of arousal. The present study extends this argument by suggesting that such typical levels of arousal may not always be moderate levels of arousal, although arousal-based processes may nevertheless underlie musical typicality.

The present results throw some light on two other aspects of music listening under more everyday circumstances. These aspects concern two patterns in the data regarding the number of times that subjects changed between the HA and LA versions of each piece. First, subjects changed between the versions very little, and this suggests that they took a rather passive approach to the music once it had been selected: perhaps music that we like is simply 'there' in the background to an activity, rather than being the main focus of our concerns. This links with the research reported in Chapter 8 which suggests that music becomes more salient as it becomes more disliked. Second, subjects tended to change between the pieces an even rather than an odd number of times. In other words, after changing the music they tended to revert back to the version that they listened to initially: in conjunction with the data shown in Figures 2 and 3 it seems that subjects usually began by listening to the appropriate version, briefly considered the arousal-moderating alternative, and then rejected it in favour of the former.

This study has shown that musical preference varies with the listening situation, and that when listening to music as a part of everyday activities, people tend to prefer arousal-polarising music that is perceived as typical and appropriate for that activity, rather than music that should moderate their level of arousal. Such results correspond with those reported in the previous chapter. More generally, these findings suggest that the specific nature of musical preferences represent an attempt to optimise the situation such that music is an aspect of our general lifestyle; and that apparently competing typicality- and arousal-based explanations of this may be at least partly reconciled in terms of their more general arguments, subjects' arousal-based goals in a given situation, and the subsequent effects that these might have on situationally typical levels of musically-evoked arousal, such that music becomes typical and appropriate by virtue of promoting a given arousal level.

Chapter 12. The Effects of Musical Complexity and Style on Responses to a Television Advertisement

Chapters 10 and 11 have demonstrated that responses to music are influenced by qualities of the listening situation. The remaining chapters in this part of the thesis investigate the opposite, complementary relationship, namely the extent to which responses to the listening situation are influenced by qualities of the music played therein. In an initial investigation of this, the study described in the present chapter considers the effects of musical complexity and style on responses to a television advertisement.

A small number of studies in the psycho-marketing literature have investigated the effects of music in television advertisements, and have provided some indication that responses to the advertisement are more favourable in the presence of liked rather than disliked music (see reviews by Bruner, 1990; North and Hargreaves, in press). Gorn (1982) demonstrated this in perhaps the best known study of music in marketing contexts. Subjects were shown a slide of either a light blue or beige coloured pen in the presence of music that was either liked (taken from the film 'Grease') or disliked (classical Indian music). As a supposed token of thanks for participating, subjects could choose one of the two types of pen from boxes located at opposite sides of the room, and 79% of subjects chose the pen associated with liked music. This suggests that liked music is effective in advertisements because it conditions preference for a product associated with it (see Byrne and Clore, 1970). This finding was supported by Bierley, McSweeney, and Vannieuwkerk (1985) who showed that preference ratings for stimuli that predicted pleasant music were greater than for those that predicted unpleasant music. Similarly, Tom (1995) found that music could condition preference for products even when subjects were not attending to them (i.e. the state in which we are perhaps more typically exposed to television advertising).

Despite its apparent acceptance by many authors in the marketing literature, the classical conditioning hypothesis has attracted a considerable number of criticisms. Indeed, there have been several occasions where music has failed to classically condition responses to products. For example, Pitt and Abratt (1988) employed a methodology virtually identical to Gorn's with the exception of the products to be conditioned - red and blue condoms. The resulting absence of conditioning effects suggests that the process may not operate for products which are 'very personal, controversial, and anything but boring' (p. 136). Similarly, Alpert and Alpert (1989) found that the mood associated with different greeting cards could not be conditioned

by pairing them with happy and sad music. Also, Allen and Madden (1985) failed to replicate Gorn's findings when humour replaced music as the unconditioned stimulus, suggesting that conditioning may not be a universal advertising process. A further criticism is that any effects of music that have been demonstrated may have been over-emphasised by the use of still rather than moving pictures in the research described above (Dunbar, 1990).

In addition to the unresolved question concerning whether music can positively influence responses to actual television advertisements, it is also possible to criticise the way that these studies have conceptualised musical stimuli. In short, the influence of affective responses in advertising music might be underspecified by terms such as 'liking', or 'happy' (Holbrook and Batra, 1987), since these tell us little about the musical characteristics that induced such a response. The previous chapters in this part of the thesis have suggested that it is possible to consider everyday music in terms such as its style or level of complexity, and this deserves investigation.

Subjects were presented with the same visual component of an advertisement in conjunction with new age music of high complexity, new age music of moderate complexity, or military marching music of moderate complexity. If musical style does influence responses to the listening context, then new age and military music should be sufficiently disparate to indicate this. Subjects rated liking for the music, the appropriateness of the music for the advertisement, liking for the advertisement as a whole, liking for the visual component of the advertisement, and likelihood of buying the advertised product. Two hypotheses may be formulated. Firstly, on the basis of the studies described above it is possible to predict that ratings of liking for the music should correlate positively with ratings of liking for the advertisement as a whole, liking for the visual component of the advertisement, likelihood of buying the advertised product, and also the appropriateness of the music (although this latter relationship may also take the form of a U-shaped curve). Secondly, music of moderate complexity should lead to the most positive responses to the advertisement, and any differences between ratings assigned to advertisements featuring the two moderate complexity music categories should indicate that musical style may mediate the effects of complexity on responses to the listening environment (cf. Chapter 8).

Method

Subjects Seventy-eight volunteers (33 males and 45 females) were drawn from members of the general public who were visitors to a university open day. Mean age

was 33.9 years (range 12-71 years, s.d. = 17.26). They were recruited through signs asking people to volunteer for research on television advertising. Twenty-six subjects were randomly assigned to each condition.

Experimental stimuli A high quality, vision-only, copy of the Cadbury's Flake chocolate bar 'Hotel' advertisement (GGT agency, London) was selected. Chocolate is advertised frequently on British television, and since it has a relatively universal appeal, responses to the advertisement could be expected to be reasonably independent of age, sex, and socioeconomic status. The original version of this advertisement contained no spoken message, and the only overt message throughout was an end-caption reading, 'The Crumbliest, Flakiest Chocolate'.

The music employed in the study comprised two 30 second excerpts of moderate complexity new age music, two 30 second excerpts of high complexity new age music, and two 30 second excerpts of moderate complexity British military marching music. These excerpts were dubbed onto the visual component of the advertisement in a professional editing suite. New age excerpts were selected from the stimuli employed in Chapter 6: two moderate complexity excerpts (mean ratings of 4.71 and 5.22, respectively), and two high complexity excerpts (mean ratings of 8.60 and 7.92, respectively) were selected for use in the study. The military music excerpts were selected on the basis of a pilot study in which a further 25 undergraduate subjects rated 24 candidate excerpts on the same scale of complexity employed in Chapter 6. These 24 excerpts were chosen so as to represent a putatively moderate level of complexity. Two were then selected with mean complexity ratings of 4.72 and 5.19 respectively. These two values are approximately equivalent to those of the moderate complexity new age excerpts: it therefore seems reasonable to compare directly the ratings assigned to these two categories. Details of the musical excerpts appear in Appendix 12.1.

Design Independent groups of subjects were employed to prevent any possible demand characteristics in ratings assigned to advertisements featuring different types of music. Subjects were presented with only *one* musical category (i.e. moderate complexity new age *or* high complexity new age *or* moderate complexity military) accompanying the visual component of the advertisement. Since each musical category contained two excerpts, each subject was presented with two advertisements. The presentation order of these two advertisements was counterbalanced. The first advertisement contained the visual component paired with a musical excerpt from one of the three musical categories. The second advertisement contained the visual

component paired with the other musical excerpt from the given musical category. Two versions of the advertisement were presented to each subject so as to provide a measure of the reliability of their responses: any significant differences between responses to the two versions should indicate that some difference existed between the pieces within each music category that was influencing subjects' responses.

Following its presentation, each advertisement was rated by subjects on 11-point scales of liking for the musical component; appropriateness of the music for the advertisement (which was further defined as the extent to which the music was typical of that they would expect to hear with the advertisement); liking for the visual component; liking for the advertisement; and probability of buying the advertised product (hereafter, 'purchase probability'). The latter two measures have many precedents in the psycho-marketing literature (see e.g. Bruner, 1990). On all these variables, 0 represented the low end of the scale, and 10 represented the high end. Each of four different orderings of the rating scales were presented to 6 or 7 subjects within each group. Subjects were asked to indicate on their response sheet if they had previously heard either of the two musical excerpts with which they had been presented: no subjects did this, but if they had then their responses associated with the recognised excerpt(s) would have been discarded from the analyses.

It should be noted that the study did not attempt to provide a full test of Berlyne's theory. Rather, high and moderate complexity new age categories were employed so as to determine whether musical complexity is a factor that allows us to specify the relevant characteristics of music in mediating responses to television advertisements. The use of only two complexity levels seems adequate to test this: in short, do variations in musical complexity have *any* influence on responses to the listening situation ? Similarly, moderate complexity military music was employed so as to determine whether any further variations in musical style cause the liking-complexity relationship to break down. As noted in Chapter 8, real musical stimuli vary along several dimensions such as musical style. This may well have an additional influence on subjects' responses, such that investigations of real music may over-simplify the issue by studying only a single variable. The present study aims to provide some initial data on these two musical variables.

Procedure Groups of 13 subjects sat in rows in front of a large television screen, and the experimenter ensured they had an unobstructed view. Written instructions were given, and were reinforced by a verbal summary. These instructions emphasised that subjects should carefully consider their ratings as each advertisement was being

presented. At the end of the instructions to subjects was a brief paragraph stating (falsely) that the university had been asked to pilot test different versions of the advertisement with a view to selecting one for national transmission. Informal discussions with subjects on their leaving the experiment confirmed that this cover story was highly convincing.

Subjects were presented with the visual component of the advertisement accompanied by the first musical excerpt from the given musical category. On the basis of pilot research, subjects were given a further 20 seconds to finalise and mark their ratings after the presentation of the advertisement. Subjects were then presented with the visual component of the advertisement accompanied by the other musical excerpt from the given musical category, and were again given a further 20 seconds to record their ratings. Subjects were de-briefed at the end of the open day.

Results and Discussion

Repeated measures t-tests were carried out within each category of music x dependent variable combination to test for any differences between ratings assigned by each group to the two versions of the advertisement they saw. Values of t ranged between +/-0.18 and 0.78, and were all non-significant. This indicates that subjects' responses were consistent between the two versions of the advertisement they were each presented with. A series of one-way independent subjects ANOVAs was also carried out to test for differences on each variable between the four orderings of the rating scales. Values of F ranged between 0.23 and 0.68 and were all non-significant, which means that subjects' ratings were not influenced by the order in which they were assigned.

<u>Regression of liking for the music on other variables</u> Product-moment and partial correlations were calculated to investigate the relationships between liking for the music and each of liking for the advertisement, purchase probability, and liking for the visual component. The results of these are presented in Table 12.1 in which values of N refer to product-moment correlations, and values of d.f. refer to partial correlations.

Taken together, these coefficients indicate that liking for the music was associated positively with all these responses to the television advertisement. The positive correlation between liking for the music and liking for the advertisement is perhaps less surprising in that music was one aspect of the advertisement, and could reasonably be expected to feature in this latter rating. However, liking for the music

Variables (Type of Correlation)	Partialled Out	r	N or d.f.	p
Liking for the music - Liking for the advertisement (Partial)	Liking for the visual component	+0.67	d.f. = 152	< 0.01
Liking for the music - Purchase probability (Partial)	Liking for the visual component	+0.34	d.f. = 151	< 0.01
Liking for the music - Liking for the visual component (Product-moment)	N/A	+0.20	N = 155	= 0.01

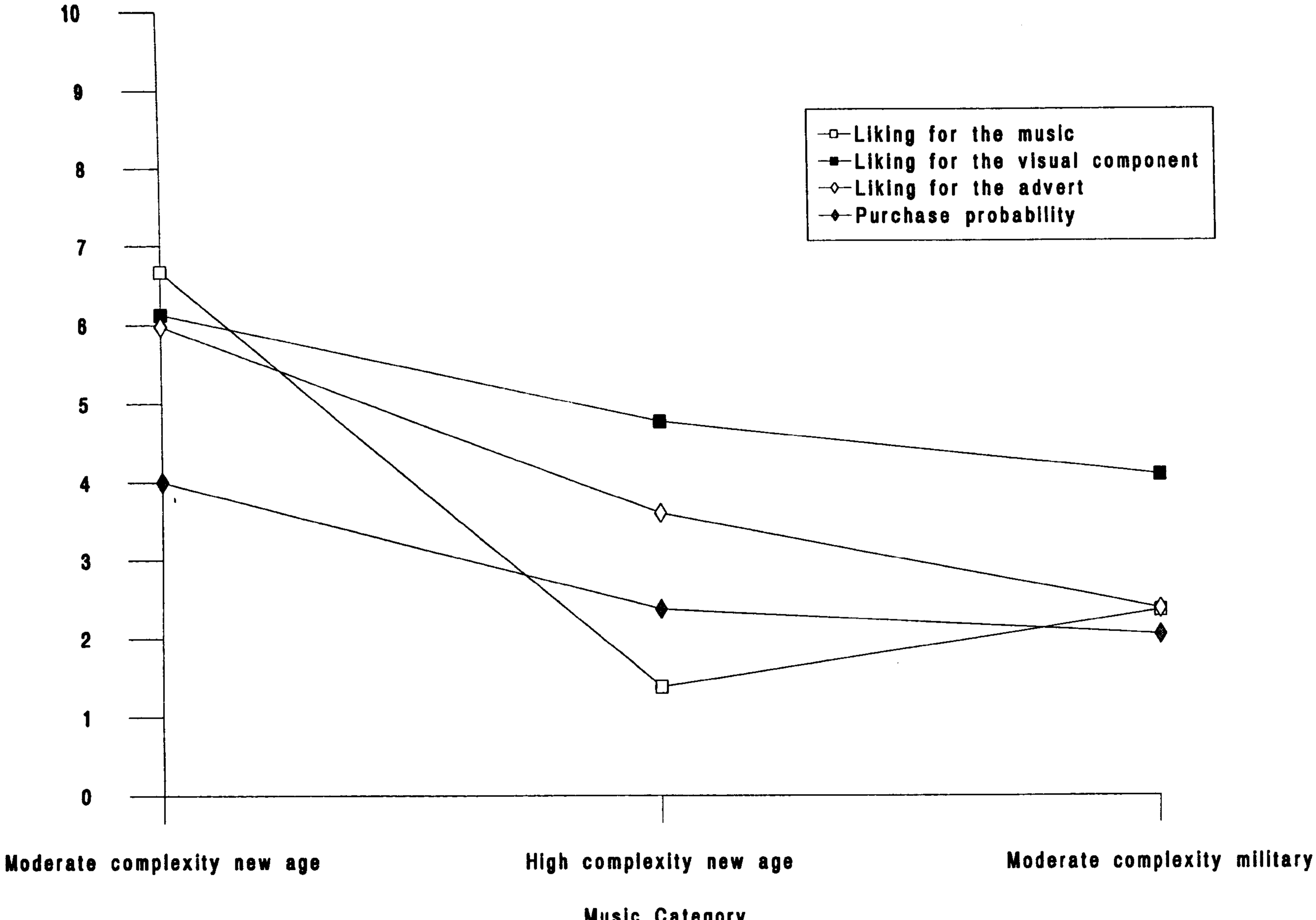
Table 12.1 - Results of product-moment and partial correlations

also correlated positively with the two other variables considered, and both purchase probability and liking for the visual component might be seen as more removed from the music itself than liking for the advertisement (although the correlation between liking for the musical and liking for the visual component, whilst significant, was rather low): these latter two correlations perhaps provide a clearer demonstration that responses to music are associated with other aspects of its immediate context. Also, the relationship between musical preference and purchase probability seems to be generally consistent with the findings of psycho-marketing studies on how music might classically condition product preferences.

Curvilinear regression analysis was carried out to determine the fit of linear and quadratic models to the relationship between liking for the music and its perceived appropriateness. Both the linear and quadratic models were fitted significantly to the data ($F = 109.22$, d.f. = 153, $p < 0.001$; and $F = 77.87$, d.f. = 152, $p < 0.001$ respectively) with values of R^2 (0.42 and 0.51 respectively) indicating that the data is best described as conforming to a quadratic function. The regression equation for this relationship ($Y = 1.25 + 1.69X + 0.13X^2$) indicates that it took the form of a positively accelerating curve. This is consistent with the preference for prototypes model and the findings of previous chapters concerning the relationship between liking for music and its typicality/appropriateness. However, it should also be noted that ratings of appropriateness may have at least in part reflected variations in the complexity and style of the music employed.

Musical complexity and style A series of one-way independent subjects ANOVAs was then carried out, and these demonstrated significant differences between ratings assigned within the three musical categories on measures of liking for the music ($F = 87.22$, d.f. = 2, 152, $p < 0.01$); liking for the advertisement ($F = 38.40$, d.f. = 2, 153, $p < 0.01$); purchase probability ($F = 12.47$, d.f. = 2, 152, $p < 0.01$); and liking for the visual component of the advertisement ($F = 10.63$, d.f. = 2, 153, $p < 0.01$). The means for each musical category are plotted in Figure 12.1. Tukey HSD tests indicated that ratings assigned on each of the variables to advertisements featuring moderate complexity new age music were significantly higher than ratings assigned to advertisements featuring the two other musical categories. The only other significant difference indicated by the Tukey tests was between ratings of liking for the advertisements featuring moderate complexity military music and those featuring high complexity new age music (with the former being lower).

Figure 12.1 - Mean Ratings Across the Three Types of Music



The clear pattern to emerge from these Tukey tests confirms the visual impression of Figure 12.1: higher ratings on all four measures were assigned to advertisements featuring moderate complexity new age music than were assigned to advertisements featuring either high complexity new age music or moderate complexity military music. The ratings assigned to the advertisements featuring the latter two musical categories only differed significantly on measures of liking for the advertisement. Musical complexity therefore influenced ratings such that moderate complexity music was more effective than high complexity music: this suggests that variations in complexity may underlie the effects of music on stimuli associated with it. However, musical style mediated this relationship, with ratings assigned to advertisements featuring moderate complexity military music being generally as low as ratings assigned to advertisements featuring high complexity new age music. This corresponds with the findings reported in Chapter 8 by indicating that musical complexity and style *both* appear to be relevant in explaining the effects of music on responses to the listening environment.

This raises three issues concerning the effects of musical style on subjects' responses in everyday contexts, and each of these might be followed up by future research. First, why should subjects' responses be influenced by stylistic variations ? The answer may lie in consequent variations that these elicit in listeners' familiarity with the music and/or its appropriateness for the listening context. Second, there is a need to determine the relative influence of musical complexity and style on responses to the listening environment. Aside from the academic interest of such an issue, its resolution would be presumably of use to those involved in preparing television advertisements. It would presumably be much easier to manipulate musical style rather than complexity, and so to what extent is it necessary for advertisers to also consider the latter ? This leads to a final issue. Although beyond the aims and scope of the present study, it would certainly be interesting to investigate the interaction between several levels of complexity and musical style, and possible differences in the importance of each at different factor levels. One possibility is that variations in musical style may be much less important at extreme levels of complexity: for example, very complex music may have a negative effect on subjects' responses irrespective of the style it represents, whereas stylistic variations may become much more important when the music in question is of a moderate level of complexity (i.e. style is possibly of greatest importance in 'fine-tuning' viewers' responses).

In conclusion, the present results provide some initial evidence that responses to music are associated positively with responses to other aspects of the listening

environment, and both musical complexity and style may be relevant factors in explaining these effects. The results also demonstrate again that musical typicality/appropriateness is related to preference. More generally, these results demonstrate that musical preference is not an isolated phenomenon that is detached from its immediate environment, such that a context-independent approach to the psychology of music may fail to recognise important aspects of our everyday musical behaviour.

Chapter 13. The Effects of Music on Responses to a Dining Area

The study reported in the previous chapter provided some initial indication that responses to music may influence responses to the listening environment, and that variations in musical complexity and style appear to be two factors that underlie such effects. The research reported here continues this approach by means of a field study investigating the effects of musical complexity and style (and a no music control) on responses to a university cafeteria. These data were collected as part of the study reported in Chapter 8, but are reported separately since they concern the effects of music on responses *to* the environment.

Chapter 7 described how although a small number of psycho-marketing studies have investigated the effects of music on responses to the listening environment, these studies have tended to be limited in two important aspects. Firstly, the dependent variables measured tend to be very specific to the goals of the research. Since the studies do not directly investigate the effects of music on *general* responses to the listening environment, they provide little insight into such effects. It is unclear whether music may influence the more general affective qualities of the listening situation, such as a simple measure of liking for that environment. Secondly, with the exception of Konecni's research, these studies typically categorise the music they employ in a rather global manner (e.g. liked versus disliked music). Research which investigates the effects of specific characteristics of the music employed should provide greater insight into its effects.

In light of these arguments, the present study aims to determine whether specific musical characteristics can influence general responses to the listening environment. It does so by manipulating musical complexity and style, and employing a response taxonomy derived from Mehrabian and Russell's (1974) model of environmental psychology. The Mehrabian and Russell response taxonomy provides a means of specifying those general responses to the listening environment which may be influenced by music, and the manipulations of complexity and style provide a means of specifying those musical characteristics which bring about such an influence.

The Mehrabian and Russell model of environmental psychology deals with the interaction between the pleasantness of an environment, the arousal-evoking qualities of that environment, and individual differences in responses to environmental arousal. The present research draws on *only* that aspect of the model which states that all responses to an environment may generally be characterised as aspects of what are

termed 'approach' and 'avoidance' behaviours. Liked environments are claimed to lead to approach behaviours, and disliked environments are claimed to lead to avoidance behaviours. Mehrabian and Russell state that approach-avoidance behaviours have four aspects. These are (i) a desire to physically stay in (approach) or to leave (avoidance) the environment; (ii) a desire or willingness to look around and to explore the environment (approach) versus a tendency to avoid moving through or interacting with the environment (avoidance); (iii) a desire or willingness to communicate with others in the environment (approach) versus a tendency to avoid interacting with others or to ignore communicative attempts from others (avoidance); and (iv) the enhancement (approach) or hindrance (avoidance) of satisfaction with tasks performed.

Mehrabian and Russell's model has aroused considerable interest, and the basic issues identified have stimulated a great deal of research on responses to environments (e.g. Amato and McInnes, 1983; Baker, Levy, and Grewal, 1992; and Gurbindo and Ortega, 1989), and the psychology of affect (e.g. Havlena and Holbrook, 1986; Mehrabian and Wixen, 1986; Russell and Pratt, 1980; Russell, Ward, and Pratt, 1981; and Valdez and Mehrabian, 1994; see also Chapter 3). Of particular relevance to the present research is a study by Donovan and Rossiter (1982) who measured the atmosphere of retail environments in terms of approach and avoidance behaviours. They showed that consumers represented the in-store atmosphere in terms of the Mehrabian and Russell dimensions of pleasure and arousal, and that these were significant mediators of intended shopping behaviours.

Although music is present is a variety of everyday situations, its potential influence on responses to the environment has been neglected in comparison with other variables. Despite the absence of theories that may account specifically for the influence of music on affective responses to the listening situation, it seems reasonable to assume that liked music should make the environment more pleasant, and lead to an increase in dependent measures akin to approach behaviours towards that environment: disliked music should make the listening environment less pleasant, and lead to a decrease in such measures. Note that further support for this contention is provided by Byrne and Clore's (1970) reinforcement model of evaluative response, which states that positive or negative affect elicited by a stimulus situation conditions behaviour towards the specific stimulus eliciting the affect, and also towards those stimuli merely associated with it. More simply, the music in an environment should condition responses to that environment itself.

In the present study, an advice stall was set up in a university cafeteria offering leaflets on a variety of welfare topics. A loud speaker situated by this stall played new age music of low, moderate, or high complexity; Wurlitzer/mechanical organ music of moderate complexity; or silence. These five different types of stimuli are the basis of the five experimental conditions investigated by the study. In addition to ratings of liking for the music and the number of aspects of the cafeteria that subjects wanted to change which are reported in Chapter 8, the remaining dependent measures taken were based on the Mehrabian and Russell response taxonomy and concerned responses to the environment itself. Diners in the cafeteria completed a questionnaire which investigated liking for the atmosphere in the cafeteria, willingness to return to the cafeteria, and perceived likelihood of visiting the advice stall. The degree of persuasion diners required before agreeing to complete the questionnaire was also investigated: a diner who required little persuasion to complete the questionnaire was considered as demonstrating a positive response to the environment, whilst a diner who required a great deal of persuasion was considered as demonstrating a negative response to the environment, i.e. an unwillingness to communicate with others (see also Fried and Berkowitz (1979) on music and helping behaviour). Four behavioural measures were taken, namely the number of people visiting the advice stall; the number of leaflets taken from the stall; the number of people initiating conversation with the person on the stall; and finally, the number of people coming to the stall to complain about the music.

The principal aim of the study was to determine whether liking for music is positively related to responses towards the environment in which that music is experienced. If so, then a negative correlation should maintain between liking for the music and the degree of coercion required before diners agreed to complete the questionnaire. Also, positive correlations should maintain between liking for the music and each of the three remaining questionnaire measures, namely liking for the atmosphere in the cafeteria, willingness to return to the cafeteria, and perceived likelihood of visiting the advice stall. A second aim of the study was to investigate the role of musical complexity in these relationships. On the basis of Berlyne's theory it is possible to predict that moderate levels of musical complexity should be most liked, such that musical stimuli of moderate complexity should lead to the lowest amount of persuasion being required before subjects agree to complete the questionnaire and the lowest number of complaints about the music. Such music should lead to the most positive responses on the remaining verbal and behavioural measures. The final aim was to investigate whether musical style could mediate the effects of musical complexity on responses to the listening environment. New age and

Wurlitzer/mechanical organ music are relatively disparate styles, and any differences between responses given in those conditions employing new age music of moderate complexity and organ music of moderate complexity should indicate a limitation on the extent to which complexity alone can predict the effects of music on responses to the listening environment. It should be stressed that as in Chapters 8 and 12, the aim of this section of the study is merely to determine whether variations in musical style can have any influence *at all* that cannot be explained in terms of complexity: the study makes no attempt to investigate the interaction between musical style and complexity.

Method

Subjects As for Chapter 8, although an additional 49 subjects (25 males, 24 females) responded to the environment in the 'no music' condition, leading to a total sample of 285. Data from one other subject was discarded since the time she required to complete the questionnaire spanned the 'no music' and one of the music conditions.

Materials and design

i) Experimental music As in Chapter 8. In addition to this, ten minutes of silence were also recorded at the end of each tape to form a 'no music' condition which was investigated here.

ii) Presentation of music As in Chapter 8.

iii a) Questionnaire measures In addition to those described in Chapter 8, four further variables were measured by means of a questionnaire administered by three female experimenters to diners in the cafeteria. Diners were approached only if they were seated in the half of the cafeteria where the stall was situated. The degree of coercion required to persuade a diner to complete the questionnaire was assessed by means of a memorised script followed by the experimenter on approaching that person. A panel of three independent judges produced a series of 6 statements which they rank ordered for coerciveness. The script followed by the experimenter began with the least coercive of these statements, and progressed at two second intervals up to the final most coercive statement. The experimenter only ceased this progression when either the diner agreed to participate, or the end of the script was reached. A ranked list of the statements may be found in Appendix 13.1.

On the questionnaire, subjects rated three further variables using 11-point Likert scales on which 0 represented the low end of the scale, and 10 represented an equally high point. Subjects rated liking for the atmosphere in the cafeteria at that time; how happy they would be to return to the cafeteria; and how likely they would be to visit the advice stall. Subjects completing the questionnaire were allowed as long as they required to give their responses. As noted in Chapter 8, any possible effects of familiarity with the musical excerpts were dealt with by asking all subjects to state if they had heard the music previously. None of the subjects did this, although if they had then their ratings would have been discarded. Note that although the specific experimental stimuli were all novel to subjects this does not preclude the possibility that the two musical styles employed were differentially familiar. It should also be noted here that subjects' ratings of liking for the music (see Chapter 8) were employed in the present analyses to investigate their degree of correlation with the four questionnaire variables described above.

iii b) Behavioural measures The number of people approaching the advice stall was investigated by means of a series of small stickers placed on the floor approximately one metre away from the stall. These represented the boundary of an 'approach area'. People were considered as having visited the stall when they entered this area, and continued to approach the stall. This was assessed by an experimenter seated at the stall, and was confirmed at the end of each music condition by a second experimenter seated inconspicuously at a nearby table: the judgements of these two experimenters agreed throughout. The experimenter seated at the stall remained silent unless spoken to, and also noted the number of people initiating conversation with him, the number of leaflets taken, and the number of people complaining about the music. To allow them to become familiar with the measurement procedures, all five experimenters participated in two practice sessions in a different location during the week prior to testing.

Procedure See Chapter 8.

Results

During the two days of testing only 32 leaflets were taken from the advice stall (19 of which were taken by two people), and only 12 people initiated conversation with the person staffing the stall. The data from these two measures were therefore not analysed further. Independent t-tests were calculated for each condition x dependent measure combination between data collected on the first and second day of testing.

Values of t ranged between +/-0.09 and 0.58, indicating that none of the measures showed a significant difference between the two days of testing. Therefore, responses to the two tape orderings appeared to be similar, and were aggregated in further analyses.

Product-moment correlation coefficients were calculated between subjects' ratings of liking for the music and their scores on each of the four questionnaire measures of response to the environment described above. The results of these analyses are reported in Table 13.1.

A series of one-way independent subjects ANOVAs and Tukey HSD tests was calculated on the questionnaire measures and the number of people actually visiting the advice stall to test for differences in subjects' responses between the five conditions. The results of these are presented in Table 13.2.

The frequency of complaints about the music was low, but remains of interest. High complexity new age music, moderate complexity organ music, low complexity new age music, and moderate complexity new age music elicited 9, 4, 1, and 0 complaints respectively.

Discussion

The results indicate that positive relationships existed between responses to the music and different aspects of responses to the listening environment, and this is consistent with the findings of the previous chapter. A positive correlation was found between liking for the music and liking for the atmosphere in the cafeteria, subjects' desire to return to the cafeteria, and subjects' reported likelihood of visiting the advice stall. These results indicate that the more the music was liked then the more subjects liked the listening situation, the more they wanted to return to that situation, and the more they reported being attracted to the source of the music. The correlation between liking for the music and the degree of coercion required before diners agreed to complete the questionnaire was non-significant. In sum however, these results indicate that positive responses to the music were generally associated with responses to the environment that are akin to approach behaviours.

The effects of the different conditions on responses to the environment were predictable from the complexity and style of the music they employed, and the large number of significant differences found in the one-way ANOVAs and Tukey tests

Variable correlated with liking for the music	r	N	p
Number of coercive statements required before agreeing to complete the questionnaire	-0.09	232	0.20
Liking for the atmosphere	+0.44	231	< 0.01
How happy subjects would be to return	+0.54	229	< 0.01
Likelihood of visiting the advice stall	+0.22	230	< 0.01

Table 13.1 - Product-moment correlations between liking for the music and five other variables

Variable	Low complexity new age	High complexity new age	Moderate complexity new age	Moderate complexity organ	No music	F	d.f.	p
Number of coercive statements required before agreeing to complete the questionnaire	1.58	1.64	1.20	1.73	1.35	2.59	4, 277	< 0.05
Liking for the atmosphere	4.88^{ab}	5.14^{c}	6.37^{acd}	5.11^{e}	6.06^{b}	4.51	4, 276	< 0.01
How happy subjects would be to return	4.29^{ab}	4.26^{cd}	5.88^{ace}	3.76^{ef}	7.12^{bdf}	16.62	4, 275	< 0.01
Likelihood of visiting the advice stall	1.92	1.61	2.43	1.87	2.39	1.40	4, 275	0.23
Number of people actually visiting the advice stall	4.71	3.67^{a}	10.71^{ab}	6.02	4.01^{b}	3.51	4, 34	< 0.02

Within rows, similar symbols mark means which differ at the $p < 0.05$ level

Table 13.2 - Differences between the conditions on responses to the environment

indicate that the style and complexity of the music in a given condition were important in determining responses to the listening situation. The questionnaire data presented in Table 13.2 shows that responses to the environment were more positive, if not always significantly so, in the moderate complexity new age music condition than in all three other musical conditions. Secondly, with the exception of ratings of willingness to return to the cafeteria, Table 13.2 shows that the moderate complexity new age condition was generally associated with more positive verbal responses to the environment than the no music condition. This conclusion must be more tentative however, since these differences failed to attain statistical significance within each of the questionnaire measures. Therefore, although these results are less clear than those obtained through correlational analyses, the general pattern suggests that moderate complexity new age music led to more positive verbal responses to the listening environment than other forms of music, and also possibly silence.

The results from the behavioural measures support this assertion. Table 13.2 shows that new age music of moderate complexity led to the highest number of people actually visiting the advice stall, and this number was significantly higher than that which occurred in conditions employing either new age music of high complexity or no music. However, since there were no other significant differences between the means, this suggests that music was *significantly* better than no music at attracting people to its environmental source only when both style and complexity were optimal. When music of non-optimal style or complexity level was employed, the environmental source of that music was no more attractive than it was in the absence of music.

Although the number of complaints was insufficient for statistical analysis, the condition which employed new age music of moderate complexity elicited the lowest number (0). This is consistent with the general pattern of results concerning the effects of musical style and complexity, and is of interest given that a complaint constitutes a particularly strong response (as demonstrated by one complainant in the high complexity new age condition who threatened physical violence unless the experimenter agreed to 'turn that ****ing music off' !).

The implications of three aspects of the results require further comment. Firstly, both musical complexity *and* style appeared to mediate the effects of music on responses to the listening situation. Complexity influenced responses within those conditions employing new age music in that moderate complexity music elicited the most positive responses. However, musical style appeared to be capable of mediating the

effects of complexity: although not always significantly so, new age music of moderate complexity had a consistently greater positive influence on responses to the environment than organ music of moderate complexity. Since these two conditions were of equivalent complexity, the differences between responses in them are almost certainly attributable to differing responses to the styles themselves (and perhaps the e.g. familiarity, typicality/appropriateness etc. of those styles). Although musical complexity influenced subjects' responses, the mediating effect of musical style indicates a limitation on the extent to which complexity alone may predict the effects of music on responses to the listening environment, and this is consistent with the findings reported in the previous chapter.

A related second point concerns the data presented in Table 13.2. As noted above, this indicates that new age music of moderate complexity did not lead to *significantly* higher ratings than no music on any of the questionnaire measures, and that ratings of the extent to which subjects would be happy to return to the cafeteria were slightly (although non-significantly) higher in the no music condition than in the moderate complexity new age condition. These findings might suggest that the 'correct' choice of music does not necessarily always lead to more positive responses to the environment than no music. However, since mean liking for new age music of moderate complexity was below the midpoint of the rating scale (see Chapter 8), it is possible to speculate that future research which employed music of moderate complexity drawn from a more popular style would elicit much higher ratings on the dependent measures of response to the environment.

Finally, it is interesting to compare the behavioural measure of the number of people who *actually* visited the stall with the questionnaire measure of subjects' *reported likelihood* of doing this. Only the former measure indicated that significant differences existed between the conditions. This indicates that musical style and complexity *actually* influenced the attractiveness of the musical source without subjects expressing this verbally. Future research should investigate this assertion, since it indicates that people may not always be directly aware of (or may be unwilling to admit to) the effects of musical characteristics on their behaviour in an environment.

Although this study utilised only the response taxonomy of the Mehrabian and Russell model, the lack of empirical research on the topic addressed here means that it is interesting to consider the present results in terms of the wider theory Mehrabian and Russell propose. The mean rating of liking for the atmosphere in the cafeteria assigned within the no music condition indicates the extent to which that environment

was pleasing in the absence of music. The mean rating of 6.06 indicates that the cafeteria was effectively neutral in this respect. The Mehrabian and Russell model states that in such an environment of neutral affect, moderate arousal should increase approach behaviours, whilst high or low arousal should decrease approach behaviours. This is particularly relevant to the present research, since Berlyne's theory claims that musical complexity is positively related to psychobiological arousal (see Chapter 1). The Mehrabian and Russell model would therefore predict that music of moderate complexity should be more likely than music of high or low complexity to give rise to approach behaviours. With the exception of responses to the moderate complexity organ music condition, the results of the present research are generally consistent with this. However, it should be again stressed that the present research was not intended to be a direct test of Mehrabian and Russell's model. Indeed, it should be noted that the present results might also be explained in terms of Byrne and Clore's (1970) reinforcement model of evaluative response, since they are consistent with the assertion that music conditioned responses to other stimuli merely associated with it. Moreover, since Byrne and Clore's model is not based on arousal, it can explain subjects' dislike of the cafeteria when organ music of moderate complexity was played: the effect would be attributed to subjects' relative dislike of this form of music, irrespective of how arousing it might have been.

In conclusion, the results indicate that positive responses to musical stimuli are associated with positive general responses to the listening situation. The nature of these responses may be tentatively predicted on the basis of musical complexity, although variations in musical style may mediate this effect. These findings correspond with those described in the previous chapter, and have obvious commercial implications. More generally, the results indicate the need for research that considers the interaction of responses to music with responses to the listening situation, and this is considered further in the following chapter.

Chapter 14. Music and Driving Game Performance

Chapters 12 and 13 have demonstrated that music can influence responses to and behaviour in the listening environment. One feature of both these studies is that subjects were fulfilling a rather passive role, such as watching television or sitting in a cafeteria. The present research, in contrast, investigated the effects of music on subjects' performance on a concurrent task. As noted in Chapter 7, music is often experienced in the context of some other task such as driving, doing housework etc.: whilst Chapters 12 and 13 suggest that music might influence responses to such tasks (e.g. liking for them), research that investigates music effects on actual task performance should comprise an interesting, more behavioural, adjunct to these findings. The research reported in this chapter considers this issue by studying the effect of music on performance on a computer motor racing game. This is done in the context of Konecni's arguments regarding the interaction between the cognitive demands of both listening to music and carrying out a task (see Chapter 7). The study also investigates the effects of these factors on musical preference.

Since they are central to the present study it is perhaps worth reiterating briefly the predictions of Konecni's model. One of the central claims of the model is that listening to music and performing a concurrent task both draw simultaneously on a limited processing capacity. As a concurrent task becomes more demanding, so there is less capacity left over for the processing of music. Consequently, liking for music should be lower when it is experienced in the presence of a demanding as distinct from an undemanding concurrent task. Also, the results of Konecni and Sargent-Pollock (1976) suggest directly that in the presence of a demanding concurrent task, liking for highly arousing (i.e. demanding) music should be lower than liking for relatively unarousing (i.e. undemanding) music.

Although Konecni's research concerned the effects of a concurrent task on musical preference rather than the effects of music on concurrent task performance, his arguments also lead to several hypotheses concerning the latter relationship: this too should be subject to an interaction between the arousal-evoking qualities of the music and the cognitive-processing demands of the task. If music and a concurrent task draw simultaneously on a limited processing capacity, then performance should be worse in the presence of arousing music than in the presence of less arousing music. Arousing music would take up processing space that could otherwise have been devoted to the task. Moreover, the qualities of the music and task should interact when subjects are presented with several possible combinations of both: for example, subjects' level of

performance might be worst on complex tasks carried out in the presence of highly arousing music, slightly better on complex tasks carried out in the presence of relatively unarousing music, and at a similar level to this latter example when a simple task is carried out in the presence of arousing music. Indeed, the value of Konecni's research lies in its potential to explain the possible link between the nature of the music, the nature of the concurrent activity, performance on that activity, *and* musical preference.

A small number of studies may be seen as providing indirect support for the view that the arousal-evoking properties and associated processing demands of music can influence task performance. For example, Kiger (1989) investigated the effects of music of 'low information load', 'high information load', and silence on performance on a text comprehension task. Comprehension was best in the first condition, and worst in the second. These results were explained in terms of high-information load music competing for attentional space and interfering with the information processing task. Similarly, Daoussis and McKelvie (1986) investigated the music that introverts and extroverts listened to whilst studying, since the latter group should be expected to have a lower baseline level of cortical arousal than the former (e.g. Eysenck, 1967). These two groups of subjects were given a reading comprehension task in the presence or absence of music, and whilst this manipulation had no effect on extroverts' performance, introverts (i.e. subjects with higher baseline arousal) performed worse in the presence than in the absence of music.

However, this pattern of results is by no means clear-cut since several studies have reported that the processing demands of music have *no* effect on task performance. Wolfe (1983) asked four independent groups of subjects to solve mathematical problems whilst exposed either to no music, or to three types of music of increasing volume. This manipulation had no effect on subjects' performance, and Wolfe argued that this was because subjects avoided attending to the music whilst performing the task (see also Broadbent, 1958; Ellis and Hunt, 1983). Sogin (1988) found that jazz, classical, and pop music (which could each reasonably be expected to impose different processing demands) failed to produce differing effects on an eye-hand co-ordination task. Similarly, Madsen (1987) found that performance on a reading comprehension task was not affected by the extent to which subjects found the concurrent background music distracting, and Perrewe and Mizerski (1987) found that although music may have had some influence on task performance, it had no effect on subjects' perceptions of the task.

Our knowledge of the effects of musically-evoked arousal on task performance is confused further by growing evidence which shows that the efficiency with which tasks are performed may simply increase with the arousing qualities of the concurrent music. Several studies reviewed in Chapter 7 indicate that the speed with which various aspects of consumer behaviour are performed can increase with the arousing qualities of the music played in those situations (e.g. loud versus quiet music, or fast versus slow music). Similarly in the task performance literature, Mayfield and Moss (1989) asked subjects to carry out calculations based on stock market prices, and suggested that these were carried out more quickly in the presence of fast rather than slow music.

This brief review of the literature makes it clear that the effects of music on task performance are by no means clear-cut, and that research has tended not to consider musical preference *and* task performance within a single experimental design: both of these variables are central to a more complete explanation of the relationship between music and the everyday circumstances in which it is heard. If music and a concurrent task are closely related, as Konecni's model suggests, then it seems desirable to study responses to both within a single research design that incorporates the effects of music listening on task performance and the effects of task performance on music listening. This is the rationale and main contribution of the present study, in which task difficulty and the arousal-evoking qualities of music are independent variables, and task performance and musical preference are the dependent variables. Research in this context also allows the investigation of a subsidiary issue, namely the possibility that musical preference may be directly related to subjects' performance on a concurrent task, such that liking for the music increases with performance quality. Chapters 12 and 13 provide some albeit indirect evidence for this, since viewers' responses to a television advertisement and diners' responses to a cafeteria both became more positive as liking for the concurrent music increased.

In the present study, subjects were asked to complete 5 laps of a motor racing computer game in a 2 (type of music) x 2 (task difficulty) independent subjects design. Whilst 'driving' the 5 laps, subjects listened to music of either high (HA) or low (LA) arousal potential: according to Konecni's model, the former should be expected to take up more processing capacity. In addition to this, subjects either did or did not carry out a backward-counting task: this could be expected to influence the difficulty of the task, or more specifically, the amount of remaining cognitive processing capacity that could be devoted to listening to the music and 'driving' the racing car. The four dependent variables were subjects' lap times, and their ratings of

how difficult they found the task, how much they liked the music, and how arousing they found that music.

If music and a concurrent task draw simultaneously on a limited cognitive processing resource, then this leads to two principal hypotheses concerning task performance and musical preference respectively. First, HA music and backward-counting should both give rise to slower lap times and higher ratings of task difficulty than should both LA music and the absence of the backward-counting task. Second, HA music and backward counting should both give rise to lower ratings of liking for the music than should both LA music and the absence of the backward-counting task. A final subsidiary hypothesis is that if musical preference is related to satisfaction with concurrent task performance, there should be a negative correlation between subjects' lap times and ratings of liking for the music (i.e. longer lap times should be associated with disliking the music).

Method

Subjects 96 subjects (48 males, 48 females) were randomly assigned to the four conditions. All subjects were between 18 and 25 years old (mean = 18.99 years, s.d. = 1.57), and were first year psychology undergraduates participating as part of their course requirement. In response to a self-report measure, subjects stated whether they played computer games 'daily, twice a week, once a week, occasionally, or never', and the frequency with which each of these options was stated was approximately equivalent across all four conditions.

Design and materials A 2 (HA music versus LA music) x 2 (backward-counting versus not backward-counting) independent subjects design was employed. An equal number of male and female subjects appeared in each of the four conditions. The LA and HA versions of the two musical pieces described in Chapter 2 were employed in the present study. The LA or HA version of one of the pieces was recorded onto a Teac A-3440 reel-to-reel multi-track tape recorder, and the corresponding LA or HA version of the other piece was then recorded onto the tape immediately following this. The ordering of these was counterbalanced for experimental condition and subject gender. This gave a total of 10 minutes of available music (since each piece lasted for 5 minutes) which proved to be of sufficient duration for the experiment. In light of the musical differences between the LA and HA versions and the measures of heart rate in response to them reported in Chapters 2 and 11, the HA versions would be expected

to be more arousing than their LA counterparts: subjects in the present study also rated how arousing they found the music as an additional check on this.

A male and female voice were recorded onto two separate tracks of the tapes, with each reading out two-digit random numbers (derived from a random number table) at 10 second intervals. The tape recorder allowed either of the voices to be played simultaneously with the music. The volume level for the voice was set so that it could be heard comfortably above the music, and the use of a male or female voice in each session was fully counterbalanced. The music and voice were played to subjects through a pair of Panasonic earphones via a Laney Linebacker 30W amplifier. As in Chapters 2 and 11, although the study was conducted in a sound-proofed room, earphones were used so as to eliminate any extraneous sounds that might have still entered. Whilst listening to the output from the tape recorder, subjects played the 'Indianapolis 500' motor racing computer game on a conventional 486 PC. This game allows the player to complete individual laps, and provides a lap time to the nearest hundredth of a second at the end of each.

Procedure On entering the room, subjects were seated on a stool whilst the experimenter demonstrated a lap of the racing game. The experimenter followed a memorised script during this lap, and demonstrated a number of features of the game such as the slippery nature of the track-side grass, how to take corners, the location of the finish line etc. At the end of this, the subject was given 7 minutes to practice playing the game. During this practice time, as in the experiment proper, subjects completed individual laps from a standing start in the pit lane, and used a specified fingering to control the car with the keyboard cursor keys.

At the end of this practice session, subjects were given instructions for the experiment proper. These were as follows; 'In a moment I would like you to drive 5 individual laps. Each will start from the pit lane. You should try to drive each lap as quickly as possible. Whilst you do this I would like you to listen to some music that you will hear through the headphones. Also, you will hear a voice reading out random numbers. I would like you to repeat back each random number as soon as you hear it.' This aspect of the methodology made attention to the auditory channel unavoidable, and was intended to address the problems reported in Wolfe's (1983) research described above in which subjects tried to block out the music from attention. When subjects appeared in the backward-counting conditions they were then given additional instructions as follows. 'Just before you begin each lap, I will say a number to you. I would like you to count backwards in threes from this number whilst you are

driving. Please count out loud.' Subjects then completed 5 individual laps. The experimenter started the tape as soon as the subject moved off, and stopped the tape at the end of each lap. After completing their laps, subjects gave ratings on the following 0-10 scales; 'how much did you like the music ?' (0 = not at all, 10 = very much); 'how difficult was the game ?' (0 = not at all, 10 = very); and 'how relaxing versus arousing was the music ?' (0 = very relaxing, 10 = very arousing).

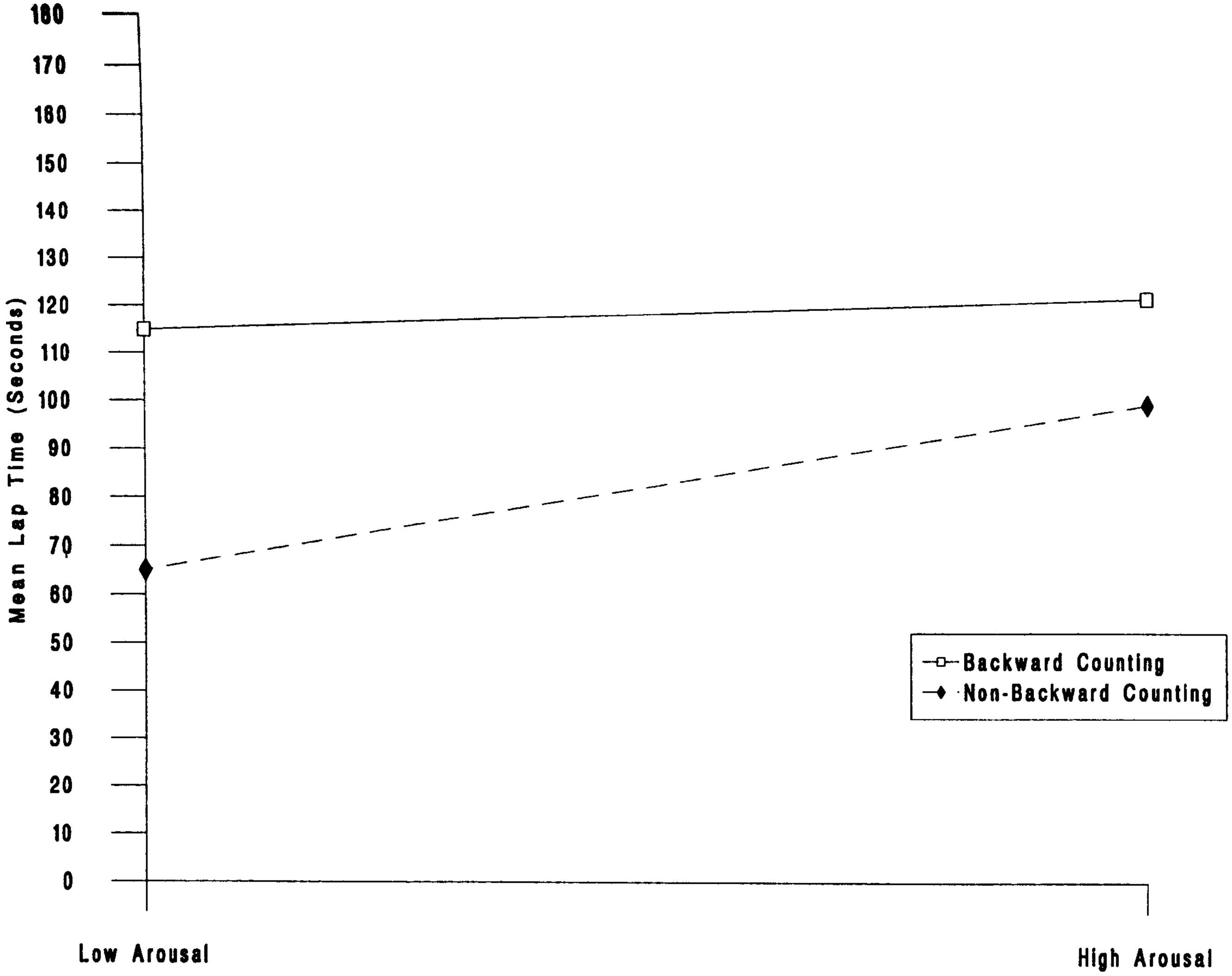
Results and Discussion

Manipulation check A 2 (LA versus HA music) x 2 (backward-counting versus not backward-counting) independent subjects ANOVA was carried out on subjects' ratings of how arousing they found the music. The only significant result was the main effect for the type of music ($F = 123.53$, d.f. = 1, 92, $p < 0.001$) which showed that HA music was rated as more arousing than LA music (means = 2.69 and 6.19 respectively). This corresponds with the musical and heart rate measures described in chapters 2 and 11.

Lap times A 2 (LA versus HA music) x 2 (backward-counting versus not backward-counting) independent subjects ANOVA was carried out on subjects' lap times. Both the type of music and the backward-counting manipulation produced significant main effects ($F = 36.95$, d.f. = 1, 476, $p < 0.001$; and $F = 116.75$, d.f. = 1, 476, $p < 0.001$ respectively), and these factors interacted with one another ($F = 16.90$, d.f. = 1, 476, $p < 0.001$). The means for this interaction are plotted in Figure 14.1.

Figure 14.1 shows that lap times were longer in the presence of HA than of LA music, and also in the presence rather than in the absence of a backward-counting task. The interaction seems attributable to a more pronounced effect of the music manipulation in the absence of the backward-counting task. The results correspond with Konecni's earlier suggestion that music and a concurrent task should compete for cognitive space, and that this affects subsequent performance. More cognitive space would be required to process HA rather than LA music, and the former led to worse performance. Similarly, backward counting should require cognitive space, and this also increased subjects' lap times. Moreover, the slowest lap times were recorded in the condition that should require the most cognitive processing (i.e. HA music/backward counting), whilst the quickest were in the condition that should require the least processing (i.e. LA music/no backward counting). In short, these results suggest that task performance is influenced by the processing demands of the task *and* the concurrent music, with both competing for limited cognitive space.

Figure 14.1 - The Effect of Two Types of Music and Backward Counting on Mean Lap Time



Perception of task difficulty A 2 (LA versus HA music) x 2 (backward-counting versus not backward-counting) independent subjects ANOVA was carried out on subjects' ratings of how difficult they found the task. Both the type of music and the backward-counting manipulation produced significant main effects ($F = 11.76$, d.f. = 1, 92, $p < 0.001$; and $F = 52.58$, d.f. = 1, 92, $p < 0.001$ respectively), and these factors interacted with one another ($F = 11.00$, d.f. = 1, 92, $p = 0.001$). The means for this interaction are plotted in Figure 14.2.

The pattern indicated in Figure 14.2 is identical to that in Figure 14.1 concerning subjects' lap times, and the present data can thus be interpreted in an identical manner. In conjunction with the results concerning subjects' lap times, these findings indicate that the music and the backward-counting task influenced not only subjects' performance, but also their perception of it.

Liking for the music A 2 (LA versus HA music) x 2 (backward-counting versus not backward-counting) independent subjects ANOVA was carried out on subjects' ratings of liking for the music (see Figure 14.3). There was no main effect for the type of music, although the backward-counting manipulation was significant ($F = 3.88$, d.f. = 1, 92, $p = 0.05$) with mean ratings of 4.73 and 5.56 in the backward-counting and none backward-counting conditions respectively. The interaction between the factors was not statistically significant ($F = 2.80$, d.f. = 1, 92, $p < 0.10$). The main effect of the backward-counting manipulation is interesting because it suggests that subjects liked concurrent music less when the task would be expected to require a greater degree of processing. This supports the idea that the cognitive demands of a difficult task mean that there should be less processing capacity left over to process the music, causing the latter to be comparatively disliked. Although the interaction between type of music and the backward counting manipulation was non-significant, Figure 14.3 provides at least some indication that the main effect of the latter factor is attributable to its effects on responses to principally HA music: the backward-counting manipulation appeared to have very little effect on liking for LA music.

Relationship between musical preference and task performance A product-moment correlation was calculated to test the relationship between subjects' ratings of liking for the music and their mean lap times. The result of this was -0.24 ($N = 96$, $p = 0.02$). Although low in magnitude, this significant correlation indicates that liking for the music was negatively related to lap times. That is, the better that subjects did on the task, so the more they liked the music. This finding corresponds with those of

Figure 14.2 - The Effect of Two Types of Music and Backward Counting on Mean Ratings of Task Difficulty

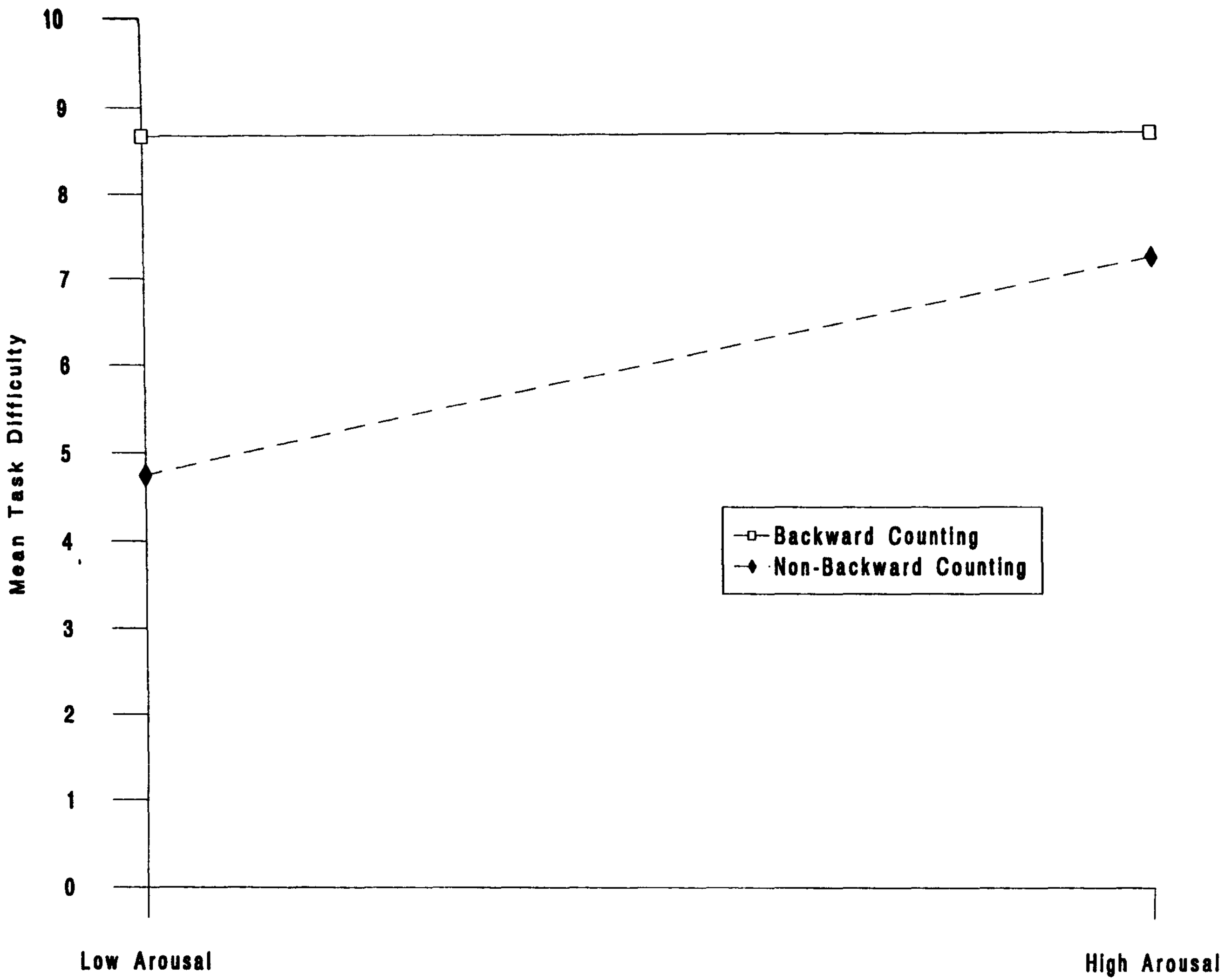
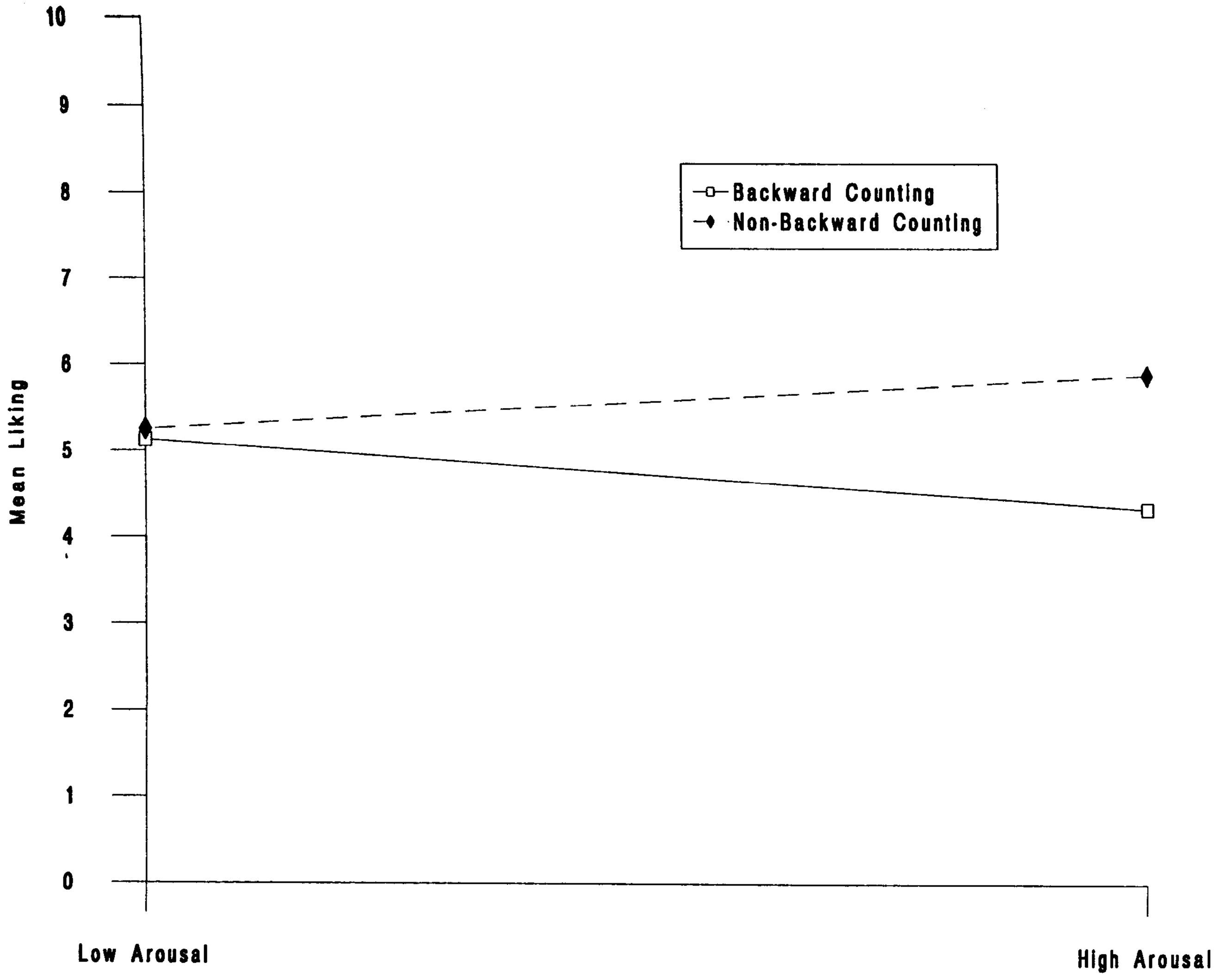


Figure 14.3 - The Effect of Two Types of Music and Backward Counting on Liking for the Music



Chapters 12 and 13 in suggesting that musical preference is related positively to satisfaction with the listening environment.

Summary and Conclusion

In general, these results seem to support Konecni's model in suggesting that listening to music and carrying out a concurrent task influenced both task performance and musical preference. Subjects' lap times were slower and they perceived the task as more difficult under highly arousing music and a difficult concurrent task as compared with relatively unarousing music and a simpler task. Moreover, lap times and the perception of task difficulty were highest under what should be the most cognitively-demanding combination of music and task (HA/backward-counting), and were lowest under what should be the least cognitively-demanding combination (LA music/none backward-counting). This suggests that music and a concurrent task compete for processing space. The effects of these manipulations on musical preference were less clear-cut, although the finding that (principally HA) music was liked less in the presence than the absence of the backward-counting task suggests that musical preference as well as task performance is related to the processing demands of the listening situation: music was liked less when the concurrent task was demanding. In addition to this, the results indicate that task performance and musical preference may be directly related (if only weakly) in that liking for the music increased as performance on the racing game improved: it seems more likely that the latter should cause the former, although the reverse relationship is of course possible.

These initial results suggest a clear need for research on one particular aspect of the relationship between music and task performance. By effectively equating music, arousal, and cognitive load, the tentative theoretical mechanism outlined above has difficulty in accurately predicting the effects of music on performance on, and preference for music heard in conjunction with very simple tasks. An arousal based explanation of such effects predicts that music should increase both these dependent measures when it is experienced in the context of a very simple task: if pleasure and performance are optimised at moderate levels of arousal (see e.g. Berlyne, 1971; Duffy, 1962; Yerkes and Dodson, 1908; and for an application to music, Wilson, 1994), and a very simple task brings about a low level of arousal, then the presence of music might well increase arousal towards an optimal moderate level. This means that music heard in the context of a very simple task should be liked and should also improve task performance. However, a cognitive explanation leads to a different prediction. If music takes up cognitive space, then its presence should be detrimental

to performance on even a very simple task, since this music would reduce the space that could be allocated to the concurrent activity. Also, liking for the music should depend on the amount of cognitive space allocated to the task and music in conjunction: if little space is devoted to processing the two, then music should be disliked even if the task is very simple. Although in practice it may prove extremely difficult to disentangle the effects of music on arousal and cognitive processes respectively, this would clearly be an interesting topic for future research.

In conclusion, listening to music affects responses to a concurrent task, and carrying out a concurrent task affects responses to music. These results shed some light on the everyday realities of music listening by demonstrating that there is a relationship between music, a concurrent task, performance on that task, and musical preference. Future research might extend these findings by investigating the role of music experienced concurrently with very simple tasks, and also the degree of analogy between the present research and the effects of different types of in-car music on driving performance under differing road conditions. More generally the results here, and in this part of the thesis as a whole, suggest that the interaction between music and the listening situation provides a potentially interesting way of addressing how 'listening to music has become fully imbedded in the stream of daily life' (Konecni, 1982, p. 500).

Chapter 15. Music and the Listening Situation: Summary and Conclusions

This part of the thesis has shown that theories of aesthetic response derived from laboratory-based, context-independent research can explain preference in the everyday situations in which people are conventionally exposed to music. That is, there is an inverted-U relationship between musical complexity and liking for music in a cafeteria, and also aerobics and yoga classes (Chapters 8 and 9). However, musical style intervenes in this relationship (Chapter 8), such that moderately complex music is not automatically more popular than music which represents more extreme levels of complexity. The effects of musical style may be attributable to the varying familiarity of different styles, variations in the extent to which different styles are typical of the music subjects experienced usually, or indeed several other factors.

There is also a generally positive relationship between liking for music and its appropriateness for the listening situation (Chapters 9, 11, and 12), and this supports the preference for prototypes model since appropriateness was defined as the extent to which the music played was typical of that experienced usually in the given listening contexts. The relationship between liking and appropriateness suggests a direct link between musical preference and the listening situation. As in Part A of the thesis, it is interesting to consider how this relates to arousal-based factors. Chapter 9 suggests that moderately complex music is that which is most typical and appropriate for a given situation. This corresponds with Chapter 6, and in isolation might suggest that evidence concerning typicality/appropriateness is no more informative than studies of the extent to which musical stimuli possess arousing qualities (e.g. complexity) per se.

However, there are two reasons why this is perhaps not the case. First, Chapter 9 showed that there were differences between the yoga and aerobics groups on ratings of liking and appropriateness, but not complexity. Therefore, measures of typicality/ appropriateness might explain variations in musical preference that complexity alone cannot. However, more compelling evidence in favour of the utility of typicality/ appropriateness is provided by Chapters 10 and 11. Chapter 10 provided some initial survey data which suggests that musical preferences might vary between different listening situations. However, the nature of these differences suggests that on at least some occasions people might deliberately select music which should polarise rather than moderate their level of arousal, and this was confirmed by an experimental study reported in Chapter 11. These two studies suggest that music might sometimes become typical/appropriate not because it brings about a moderate level of arousal, but because it brings about a level of arousal that is consummate with the goal of a

particular situation, be that a low, moderate, or high arousal state. In short, typicality/ appropriateness may be linked to arousal, although moderately arousing music is not always the most typical/appropriate for a given situation: typicality/appropriateness, and the cognitive input they imply, may be important in considering optimal levels of arousal because they incorporate people's behavioural goals in a given listening situation. Such cognitive factors may be a useful adjunct to the arousal-based models of musical preference proposed by Berlyne and Konecni.

Given this apparent link between music and the listening situation, three further studies went on to consider whether music can mediate responses to the listening environment. An initial study on television advertisements (Chapter 12) suggested that it could, and that musical complexity and style might be important variables in this. Chapter 13 described a study of music in a cafeteria which suggested that musical complexity and style were associated with verbal measures of liking for the environment and also two behavioural measures, namely the extent to which subjects were helpful and also likely to visit the environmental source of the music. The mediating role of musical complexity and style in these effects corresponds with Chapters 8 and 12 (although the effects of the latter variable could again be due to different styles being differentially e.g. familiar and/or typical of the music subjects were exposed to normally). A final study (Chapter 14) demonstrated that the arousing qualities of music interacted with the nature of a concurrent task in determining task performance and musical preference.

As with the previous studies, Chapters 12-14 demonstrate a relationship between music and the context in which it is experienced. This relationship appears to be reciprocal, since whilst Chapters 9-11 indicated that the environment influences musical behaviour, Chapters 12-14 indicated that music influences environmental behaviour. Chapter 14 provides the clearest demonstration of this reciprocity with both musical preference and task performance being influenced by the nature of the task (i.e. the listening environment) and the nature of the music heard concurrently with it.

The precise theoretical mechanisms underlying the effects of music on environmental behaviour are perhaps not so clear as they are for the reverse relationship. However, Chapter 14 provides some initial evidence that specific characteristics of the music and the situation may interact with one another, and Chapters 12-14 as a whole suggest that arousal-evoking factors may be at least involved. This obviously deserves further investigation since many aspects of a listening environment (e.g. ambient

temperature, crowding etc.) might also mediate arousal, allowing us to investigate the interaction between such factors and music: for example, when a shop is crowded then does simple unarousing music lead to greater satisfaction with the shopping experience, whereas arousing music leads to greater satisfaction when the shop is quiet ?

A second possible means of extending this research would concern the effects of musical appropriateness on responses to the listening environment. Would the situation be regarded more positively when appropriate rather than inappropriate music was played ? Areni and Kim's (1993) finding that classical music led to more expensive wine being sold than did Top 40 music (see Chapter 7) suggests indirectly that musical appropriateness may have a positive effect on responses to the environment. More generally, the results of Chapters 12-14 again suggest that music is not merely 'sonic wallpaper' that is psychologically divorced from the contexts in which it is experienced: rather, music mediates responses to those listening environments, and is part of the more general social psychological array.

Two other theoretical positions should also be considered as these both concern alternative explanations of the relationship between music and the listening situation that have not been investigated here. These are obviously both speculative, but deserve brief discussion given the lack of research in this area. In the previous chapters of the thesis, the effects of musical appropriateness have been characterised in terms of category activation processes (which perhaps correspond with given levels of musically-evoked arousal). However, it is also worth noting that such effects might be explained directly in terms of arousal: one of the variables considered by Berlyne's theory is the extent to which stimuli are 'incongruous', and this, like the other variables addressed, is held to be in an inverted-U relationship with aesthetic preference. It is possible that 'appropriateness' is a manifestation of 'incongruity', and as such could be explained in terms of Berlyne's theory. The data reported here certainly do not allow this explanation to be discounted, but the results of these studies seem not to correspond with a 'Berlynian' arousal-based inverted-U relationship between liking for music and its incongruity/appropriateness. Rather, very appropriate/congruous music was shown to be liked *more* than moderately appropriate/congruous music.

Furthermore, an arousal-based approach is perhaps unlikely to explain a second possible manifestation of situational influences on musical preference. The survey reported in Chapter 10 suggested that musical preference varied with the listening situation. One aspect of these responses suggests that this effect might possibly be

attributable to a version of the preference for prototypes approach to musical appropriateness which is stronger than that considered elsewhere: as well as matching the arousal-evoking characteristics of the music with the arousal-based goals of the listening situation (by preferring e.g. arousing music for a party), subjects also seemed to match the music and situation in terms of more cognitive factors in a way that is difficult to explain in terms of arousal.

This can be illustrated by two of the hypothetical listening situations from Chapter 10, namely 'You are making love' (Situation 14) and 'You are jogging with your Walkman on' (Situation 3). Although these two situations might be expected to give rise to similarly high levels of arousal, there were many differences between them on ratings assigned to the musical characteristics. Significantly higher ratings were assigned in the former situation for 'sensual', 'beautiful', 'lilting', 'expresses profound emotions', 'sentimental', 'quiet', 'romantic', and 'relaxing/peaceful', and significantly lower ratings were assigned for 'strong rhythm', 'attention-grabbing', 'you can dance vigorously to it', 'pop music', 'loud', and 'invigorating'. Several similar examples may be found in Table 10.1. Whilst the speculative nature of this must again be stressed, it seems as though subjects reported preferring musical characteristics that corresponded with the affective characteristics of the listening situation: if preference is related to category activation, then perhaps music is selected which will maximise the extent of such category activation processes. In short, do people use *musical* cues for category activation to prime or supplement *situational* cues, thus leading to greater category activation and preference ? This issue, and also the relationship between appropriateness and incongruity deserves to be considered by future research on music and the listening situation.

The studies reported in this part of the thesis raise four other general issues. First, it seems likely that people should select music that represents a *combination* of personal tastes and situational influences. For example, a fan of heavy rock music might not respond very positively to jazz simply because it was heard in an appropriate situation such as a cocktail reception. Instead, the listening situation should lead to either an increased tendency to expose oneself to music that possesses certain specific characteristics, or a more positive response to usually disliked music when it is experienced in an appropriate situation. Future research could investigate the relative extent to which musical selections can be predicted by a combination of personal taste and situational influences.

Second, to say that the listening situation is linked to musical preference might not be at all surprising to any member of the general public. For example, it is not particularly shocking to learn that subjects who are trying to relax tend to prefer listening to relaxing music (Chapter 11) ! Although the present results have provided some interesting evidence on the possible theoretical mechanisms underlying such effects, a second response to this possible criticism is to agree with it entirely. However, one further argument must be added in so doing. If such effects are obvious then this suggests that they must also be powerful and commonplace, such that their underlying mechanisms deserve consideration. The research in this part of the thesis can be nothing more than an initial investigation of such an undoubtedly complex issue.

The third issue concerns the relationship between verbal reports of musical preference and *actual* listening behaviour. Chapter 11 provided some initial evidence that when given the opportunity, subjects in more naturalistic circumstances do listen to the music that they say they like. This suggests the possibility that any differences that may occur more generally between verbal reports and actual music listening behaviour could simply reflect restrictions in subjects' access to music in a given situation: it is impossible to listen to the optimal music for a given situation if you do not first have access to that music.

However, in the modern world, our access to appropriate music is increasing rapidly. There are a growing number of radio stations that play only certain specific types of music (so-called 'narrowcasting'); pre-recorded music is becoming affordable to ever larger sections of the population, and people continue to make illegal copies of friends' records, tapes, and compact discs at a high rate; radio sets, tape recorders, and compact disc players are becoming increasingly portable; and the technology even exists for a system in which any piece of music may be down-loaded at will from the internet onto portable lap-top computers on a 'pay-per-play' basis. In short, music is no longer the property of opulent urban concert halls, and it is becoming increasingly easier for all people to listen to the music they want to, when they want to, wherever they want to. Advances in technology mean that this trend is likely to continue, such that the reciprocal influence between music and the listening situation may become more prevalent with time.

Finally, given the arguments proposed earlier in Chapter 7, it is worth noting that these positive results could have only been arrived at by research which directly addresses the *context* of music listening. Social psychological factors are important

determinants of music listening behaviour in their own right, such that research ignoring the listening context fails to address the extent to which its findings apply to everyday listening situations. First year undergraduates' preferences for laboratory stimuli are only important in that they may shed light on the responses of 'real' people to real music heard in real listening situations. Laboratory investigations are an extremely useful means of considering such a complex phenomenon as music, but the results of such research can only be ultimately meaningful in terms of studies with a greater degree of ecological validity. More explicitly, the full potential of theories of musical preference can only be realised in terms of their ability to explain actual music listening behaviour, such that there is scope for a social psychology of musical preference that draws on theories concerning psychology and the arts but also other everyday aspects of psychological functioning.

This part of the thesis has indicated that social psychological factors are relevant in responses to music, in that music is a means of achieving wider goals relating to other aspects of everyday behaviour: in essence, musical preferences are part of our more general lifestyle. However, aside from the listening situation there are several other social psychological aspects of everyday music listening that remain virtually virgin territory, ignored by research on experimental aesthetics. Some of these aspects of responses to music in the real world are considered in the following two parts of this thesis.

Part C. Extra-Musical Information

Chapter 16. Extra-Musical Information

Part B demonstrated that responses to music interact with the listening situation: music is not experienced in a 'social vacuum' but is rather one part of a broader social psychological environment. This suggests more generally that responses to music in the real world may reflect responses to variables other than those intrinsic to the specific musical stimuli in question. With few exceptions however, such extra-musical factors have been largely ignored by studies of musical preference. The studies reported in this part of the thesis maintain the progression of Parts A and B from musical to extra-musical variables by considering two previously unresearched, social psychological, extra-musical factors that might be involved in aesthetic responses to music. These two factors are the stereotyping of musical styles and the people who listen to those styles, and the physical attractiveness of the performer. These factors both in some way concern the impact of extra-musical information on responses to musical stimuli.

The two most widely investigated extra-musical factors concern the effects on preference of conformity to a group, and of manipulating the prestige of various pieces of music. This chapter briefly reviews the research on these areas, and thereby places the following two studies in their more general context. More specific background details related to each particular study are reviewed in the respective following chapters.

Conformity effects Three studies of musical stimuli have been carried out which mirror Asch's (1956) well-known research on how subjects judging the relative length of different lines tend to conform to the clearly erroneous decisions of a group. A study by Radocy (1975) is perhaps most clearly related to Asch's initial work, and employed the same basic technique. Subjects were asked to make pitch or loudness judgements by publicly indicating which of three tones matched a standard. These judgements were made *after* four confederates had already given their decisions, and on certain critical trials these confederates made deliberately erroneous responses. Subjects conformed to the erroneous group decision on 30% of the critical trials for pitch judgements and on 49% of the critical trials for loudness judgements, and this was statistically significant. There was also some evidence that conformity increased as the judgements became more difficult.

Inglefield (1968) measured scores on a musical preference inventory. This was completed under either neutral conditions or Asch-like peer group pressure

conditions, and subjects in these latter conditions tended to conform to the judgements of peers. Also, conformity was greater amongst subjects who scored high on measures of other-directedness, need for social approval, and dependency.

Finally, in Crowther's (1985) study, subjects selected between four music channels on an OMLR (see Chapter 2), and pilot testing established that two of the channels contained liked music whilst the other two were disliked. By means of a panel of lights, subjects in the main study could see which channels other subjects were supposedly listening to, although this display was actually manipulated by Crowther so that subjects could be given false information concerning the listening decisions of their peers (see Krech, Crutchfield, and Ballachey (1962) for a discussion of the advantages of this technique). By making subjects think that their co-listeners had selected channels containing disliked music, Crowther was able to influence subjects into spending more time listening to these disliked channels than did a control group which was not presented with the bogus information.

These three studies all indicate that the musical judgements of a minority may shift towards those of the majority. However, more general research on such group influences (e.g. Moscovici, 1980) has shown that this shift may also at times be in the opposite direction, with the majority moving towards the position advocated by a minority. This effect was demonstrated in the musical domain by Aesbischer, Hewstone, and Henderson (1984), who showed that presenting information concerning a minority's supposed preference for new wave music was sufficient to increase subjects' liking for this style to a level significantly higher than that obtained previously.

Prestige effects In addition to majority and minority influences, several other studies have investigated a similar phenomenon, namely prestige effects (see reviews by Crozier and Chapman, 1981; Crozier, in press). These studies concern the effects of manipulating the prestige of a given piece of music on subjects' subsequent evaluations of that piece. This manipulation has typically involved supplying subjects with varying types of misinformation concerning a piece, for example by attributing it to one source or another, or having a prestigious source (such as a teacher) advocate or disapprove of it.

Perhaps the best known study within this approach was carried out by Rigg (1948) immediately before the outbreak of World War 2. Three groups of subjects were played 6 pieces of music on two separate occasions. On the second presentation of the

pieces, the first group was told that the composer was admired by Hitler, and that the music had been used in Nazi ceremonies; the music was described to a second group in terms of its high artistic merit; and a third control group was given no information. Although liking for the music increased in all three groups as compared to the first listening, this increase was smallest in the first group, and greatest in the second. Similarly, Duerksen (1972) played a Beethoven piano sonata to subjects on two separate occasions. An experimental group was told that one performance was by an eminent pianist, whilst the other was by a student seeking admission to a graduate music course. This led to subjects rating the 'professional' version of the piece more favourably in terms of both objective and subjective factors (see similar studies by Castell and Hill, 1985; Geiger, 1950; Radocy, 1976; Weick, Gilfillan, and Keith, 1973).

A small number of studies have researched prestige effects in pop music (which is the style considered predominantly in the two following chapters). Christenson (1992) labelled records with parental advisory stickers which warn the buyer of potentially offensive content, and this led to the records being liked less by adolescents. In a similar vein, Booker (1968) and Tanner (1976) both showed that disc jockeys' advocacy of particular styles, groups, or songs may exert a considerable influence on adolescents' musical preferences. For example, Tanner (1976) presented subjects with music in the context of a 'radio programme' in which the D.J. either did or did not approve of the music, and showed that this approval led to more of that music being later selected by subjects. Chapman and Williams (1976) manipulated the status of a stylistically ambiguous piece by first establishing that subjects were 'progressive pop' fans who were disposed negatively toward 'serious' music, and then attributing the experimental music to either a progressive pop composer or its true composer, who was described as 'a leading Japanese composer of modern serious music'. The former attribution led to the piece being rated as more 'interesting', 'sorrowful', and 'weird' than did the latter. These studies, and others like them, indicate that the manipulation of information about the source of a piece of music and the effect of this on its status can influence a variety of responses to that music.

These studies provide a clear indication that responses to music may result from conformity to the opinions of others or some form of extra-musical manipulation of the prestige associated with a particular piece. The two studies in this part of the thesis investigate issues that seem indirectly related to such conformity and prestige effects, but which have not previously been researched in their own right. In effect, the studies investigate whether the hypothetical extra-musical influences they concern even exist

at all. Chapter 17 employs a survey approach to investigate whether there are stereotypes in the domain of musical taste: are particular styles and the people who listen to those styles stereotyped in any way ? (Perhaps such stereotypes might in some way underlie prestige effects on responses to music.) Chapter 18 investigates what might be regarded as one very specific prestige effect on musical preference, namely the physical attractiveness of the performer: do variations in attractiveness mediate responses to both performers and their music ?

Chapter 17. Stereotyping and Musical Taste

The importance of music in young people's lives is undeniable. Brown, Campbell, and Fischer (1986) report that 12-14 year old Americans watched approximately four hours of music television per day, and a similar study by Sun and Lull (1986) reported only slightly lower figures. Similarly, Fitzgerald, Joseph, Hayes, and O'Regan (1995) found that Irish teenagers placed their interest in music above all other leisure activities (see review by Zillman and Gan, in press). Despite this apparent keen interest in music, very little empirical evidence concerns how young people use music as part of their lifestyle, and more specifically how musical preference can operate as a 'badge' that helps to form young people's self-concept and opinion of others. In an initial attempt to explore this, the present research adopts a survey approach to investigate whether stereotypes exist concerning young peoples' perceptions of different musical styles, the people who listen to those styles, and also whether agreement exists concerning the nature of these stereotypes.

Stereotypes are defined as 'abstract knowledge structures linking ... (a) group to a set of traits or behavioral characteristics' (Hamilton and Sherman, 1994, p. 3), and their influence on responses to stimuli is illustrated in a recent review by Hamilton and Sherman (1994). This indicates that stereotypes may influence information seeking (Kunda, 1990; Skov and Sherman, 1986), information processing (Hamilton, Sherman, and Ruvolo, 1990), attention (Zadny and Gerard, 1974; Bodenhausen, 1988), interpretation of information (Darley and Gross, 1983; Sagar and Schofield, 1980), inference (Bodenhausen and Wyer, 1985; Krueger and Rothbart, 1988), and retrieval (Bodenhausen and Lichenstein, 1987; Cohen, 1981). Young people's stereotyping of music is an interesting and potentially pervasive phenomenon that deserves empirical investigation: such stereotypes, if they exist, may constitute an important piece of extra-musical information in responses to music. For example, it is possible that they may underlie the prestige effects on responses to music described in the previous chapter.

By necessity, the present research is based on a scattered and diverse literature, including normative perceptions of musical instruments and the media, demographically-based responses to music, personality differences between the enthusiasts (hereafter 'fans') of different musical styles, and limited evidence which indicates that the attitudes of fans of different musical styles may be influenced by the characteristics of the music they listen to. Each of these areas, briefly reviewed below,

suggests that people may hold stereotypes concerning musical taste, and that these may constitute a means of inferring information regarding a particular person or piece.

Stereotyping and music Although research has yet to consider the role of stereotyping in *responses* to music, a small number of studies have indicated that such normative perceptions may exist in the more general musical domain, and with reference in particular to the sex-typing of musical instruments (see review by O'Neill, in press). Abeles and Yank-Porter (1978) asked respondents to imagine that they had a young son or daughter who was interested in taking music lessons, and were asked to state which instrument they would prefer this child to learn. Clear gender-based stereotypes were demonstrated, in that the instruments most preferred for girls were the clarinet, flute, and violin, whereas the instruments most preferred for boys were the trumpet, drums, and trombone. Similarly, Delzell and Leppla (1992) found clear gender differences in the musical instruments that boys (drums, saxophone, trombone) and girls (flute, clarinet, violin) were prepared to play. Moreover, Robinson and Morris (1986) found that boys were more likely to receive musical instruments as non-requested Christmas presents than were girls, and O'Neill and Boulton (1995) found that children expected negative outcomes in terms of peer relationships if they played 'gender inappropriate' instruments.

A small number of studies have also concerned the stereotyping of musicians. For example, Davies (1978) considered the stereotypes that different sections of a symphony orchestra held of each other. Brass musicians were perceived by string players as being uncouth, heavy drinkers, loud-mouthed, coarse, and extroverted, whereas string players were perceived by brass musicians as being precious, oversensitive and humourless. More experimental studies by Bell and Cresswell (1984), Builione and Lipton (1983), and Lipton (1987) concur with these findings in also suggesting that a person's characteristics may be perceived as related to their musical behaviour.

In a more sociological study, Lichenstein and Rosenfeld (1984) asked undergraduates to rate the gratifications (e.g. 'To kill time', 'To overcome loneliness') that 'most people' obtained from media such as recorded music, radio, and also newspapers, and television. Their results showed that each medium had a clearly defined social image, such that normative perceptions of the gratifications offered by each medium differed greatly. In conjunction, these studies indicate that there are stereotypes in the musical domain in general, and they consequently suggest indirectly that responses to music may also be stereotyped.

Demographic factors Some indication of the form that these stereotypes may take is provided by predominantly sociological research on demographic differences in the fans of different musical styles. Much of this research has been conducted in the context of Gans' (1967, 1974) notion of *taste publics* and *taste cultures*. Very briefly, taste publics are defined as sub-groups of the population which hold certain values. Their cultural choices reflect these values, such that the taste public shares a common preference for certain media objects. The cultural choices made by a taste public constitute a given 'taste culture'. More simply, a taste public consists of 'people who make similar choices (of cultural content) for similar reasons' (Gans, 1974, p. 68).

Gans contends that clearly distinguishable taste publics can be identified on the basis of their demographic status, and a small number of subsequent studies of music in North America have verified this claim to some extent at least. Denisoff and Levine (1972) found that race, age, father's occupation, and education were linked to young people's musical preferences. Fox and Wince (1975) found that the musical preferences of 767 undergraduates were linked mainly to religion, but also to age, sex and social class. Dixon (1981) found that once the effects of age, education and musical involvement were partialled out, a difference maintained between black and white subjects in liking for 11 of the 16 musical styles considered. If such clear differences exist between demographic groups in terms of musical preference, then it is reasonable to assume that these may lead to stereotyping of the fans of certain musical styles in terms of their demographic status (i.e. stereotypical taste publics). Moreover, if there are actual taste cultures within music, it seems possible that stereotypical taste cultures may also exist. With respect to these, people ought to be perceived as liking only a small range of music drawn from a single taste culture such that they might not be perceived as fans of music in general, but of only a cluster of composers/performers.

Personality characteristics A small body of psychological evidence suggests another perhaps complementary form that stereotyped responses to music may take. This evidence indicates that there are actual differences in the characteristics of fans of different musical styles (see review by Kemp, in press). For example, Payne (1967) found that personality was important in explaining preference for Classical music (stable personalities) versus Romantic music (neurotic personalities). Also, Hansen and Hansen (1991) report that fans of heavy metal were higher than non-fans in measures of 'machiavellianism' and 'machismo', and lower in measures of 'cognition' (i.e. an enjoyment of intellectually demanding tasks): fans of punk rock were less

accepting of authority than non-fans. In conjunction, these studies suggest that musical style preference might be used by the perceiver as a source of information regarding *other* characteristics of a given person, and this might lead to stereotypes arising concerning the likely characteristics of fans of different musical styles.

Shared characteristics of fans and their music A small number of studies suggest that the characteristics of fans of certain musical styles may *actually* correspond with the characteristics expressed by the music they listen to. Hansen and Hansen (1991) concluded that the differences they obtained between the characteristics of fans of heavy metal and punk as compared to non-fans (see above), were clearly related to the attitudes towards society expressed in the music itself. Similarly, Yee, Britton, and Thompson (1988) found that positive attitudes towards premarital sex, drug and alcohol use, and satanism were significantly associated with liking for heavy metal music, whilst Trostle (1986) found a significant link between liking for heavy metal music and increased belief in witchcraft and the occult. Rawlings, Hodge, Sherr, and Dempsey (1995) reported more recently that psychoticism was positively related to preference for more aggressive styles of popular music. Also, Arnett (1991) found clear evidence that fans of heavy metal identify with that music: 80% of the sample played or had tried to play a rock music instrument; over half named a musician among the three people they most admired; and over a third saw themselves entering a music related career. Similar results are reported by Skipper (1973), who found that 94.4% of black subjects listed a black artist as their favourite, whilst 61.3% of white subjects listed a white artist as their favourite.

More anecdotally, the marketing strategy of Music Television (MTV) is based on the notion that music is 'a peg (people) use to identify themselves. It's representative of their values and their culture' (Denisoff, 1986, p. 345). This coincides with Gans' claim, noted above, that taste publics select those media which reflect their own values, and further suggests a correspondence between the values and characteristics inherent in a particular musical style and those possessed by the fans of that music. This potential correspondence may also be reflected in the stereotyping of musical taste.

The literature reviewed above suggests that people may hold stereotypes concerning musical styles and the fans of those styles, such that general musical style labels are informative about the music itself and also the people who listen to that music. Stereotypes of the fans of particular musical styles may be demographically based and/or concerned with their perceived characteristics. Moreover, the stereotypical

characteristics of a musical style may correspond with the stereotypical characteristics of the fans of that music.

The present study employed a questionnaire to investigate these issues in the context of three musical styles; chart pop, 'indie pop', and classical music. The hypothesis that discrete stereotypes should differentiate classical music and the two pop styles represents a relatively lenient test of stereotyping within the domain of musical taste, given the disparity that exists between these idioms. The hypothesis that distinct stereotypes should maintain between chart pop and 'indie pop' represents a more rigorous test, given that both styles are drawn from the same general idiom. The distinction between 'indie pop' and chart pop corresponds with that made by Vulliamy (1977) regarding 'legitimate' and 'illegitimate' pop respectively, where the primary feature of the former is that it is 'art', and the primary feature of the latter is that it is 'commercial'. Whilst the two styles are sonically quite similar, 'indie pop' is a style that, in comparison with chart pop, is intended to be more difficult to comprehend, often requiring the listener to be more active in determining its underlying meaning. In Britain, several weekly music magazines and newspapers (e.g. 'Melody Maker', 'New Musical Express') are devoted to 'indie pop', as opposed to chart pop.

Three equivalent versions of the questionnaire were devised, with each requiring responses concerning only *one* of the musical styles. Equal numbers of undergraduate subjects were assigned to each of these 'musical style questionnaire groups'. In each case, the questionnaire was divided into three sections. Section 1 considered the perceived demographic status of the fans. Section 2 considered the extent to which the fans were perceived as liking composers or performers selected from popularity charts for each of the three types of music. Each musical style questionnaire group was subdivided such that subjects completed only *one* of two versions of Section 3. Version A concerned subjects' perceptions of the characteristics of the *music* itself: Version B concerned subjects' perceptions of the characteristics of the *fans* of that music. The items in the two versions were worded such that a given statement regarding a characteristic of the music corresponded as closely as possible with a given statement regarding a characteristic of the fan.

Six exploratory hypotheses can be formulated on the basis of the foregoing review. First, stereotypes should exist concerning the demographic status of the fans, such that certain demographic profiles distinguish the stereotypes of the fans of different musical styles into stereotypical taste publics. Second, musical preferences should be stereotypically clustered into taste cultures, such that fans of one style of music should

be perceived as liking the composers/performers associated with that style, and strongly disliking the composers/performers outside that style (i.e. stereotypical taste cultures). Third, stereotypes should exist concerning the characteristics of each of the musical styles, such that a given musical style should be perceived as possessing certain features which distinguish it from other styles. Fourth, stereotypes should exist concerning the personality characteristics of the fans of a given musical style, such that certain perceived normative characteristics distinguish fans of one style from those of another. Fifth, the stereotypical characteristics of a given musical style should correspond with the stereotypical personality characteristics of the fans of that style: for example, if the musical style is stereotyped as pro-establishment, then the fans of that music should also be stereotyped as pro-establishment. Finally, a split-half reliability analysis should indicate agreement between subjects upon the nature of the stereotypes elicited within each style.

Method

Subjects Over a single week, 120 undergraduates (60 males, 60 females, mean age = 20.4 years, s.d. = 2.86) were recruited on the campus of a university in the East Midlands region of the U.K., having been asked to complete a questionnaire concerning music. An equal number of males and females were assigned to each of three musical style questionnaire groups. To provide further information on the sample, a panel of three independent judges assessed a self-report of musical training and experience obtained from subjects by classifying them as possessing low, intermediate, or high levels. Subjects possessing each of these three levels were similarly represented across the musical style questionnaire groups, i.e. 15, 16, and 9 subjects respectively in the chart pop group; 12, 16, and 12 subjects respectively in the indie pop group; and 14, 18, and 8 subjects respectively in the classical music group.

Questionnaire design and procedure Each questionnaire concerned subjects' opinions of only *one* of the three types of music in question (i.e. chart pop *or* indie pop *or* classical music). The questionnaire was divided into three sections. Section 1 contained five items concerning the demographic status of the fans of the given musical style, each of which was derived from research into taste publics as follows. (i) Subjects rated the degree to which the fans were religious, and (ii) their likely social class on 11-point Likert scales ranging from 0 to 10, where 0 equalled the low end of the scale, and 10 equalled a correspondingly high point. (iii) Subjects selected the most likely age group to which the fans belonged from options of '0-11 years', '12-17 years', '18-23 years', and '24+ years'. (iv) Subjects selected the most likely stage at

which the fans leave full-time education from options of 'After G.C.S.E.s', 'After A-levels/B-Tec', or 'After university'. (v) Subjects ticked the most likely gender of the fans of the style in question. The order in which 'male' and 'female' were presented on the questionnaire was counterbalanced.

Section 2 presented 24 composers/performers, with 8 drawn from each of the three musical styles. Subjects were asked to rate how much fans of the style in question would like each of these 24 composers/performers using an 11-point Likert scale where 0 = 'dislike very much', and 10 = 'like very much'. Chart pop and indie pop composers/performers were taken from record sales charts published in the 24th September, 1994 edition of the British pop music newspaper 'Melody Maker'. This issue was published a week before the study was conducted, and contained an overall pop music record sales chart, and a separate indie pop sales chart. Chart pop composers/performers were selected from those cited in the overall Top 30 singles and LP charts, whereas indie pop composers/performers were selected from those cited in the Top 30 indie singles and LP charts. Composers/performers cited in both sales charts were not considered. Classical composers were taken from the top eight cited by Farnsworth (1966) in his research on the eminence of classical music composers. Whilst this ranking is now a little dated, Farnsworth demonstrated over a series of studies spanning several decades that subjects' ratings of the most eminent composers changed very little over time, and the 1966 ranking appears to possess adequate face validity for the present day. Instructions for this section of the questionnaire stated that if subjects did not know a given composer/performer then they should not assign a rating. A full list of the 24 composers/performers is presented in Table 17.2, although these were presented in random order on the questionnaire, and subjects were not informed of which musical style each represented.

Section 3 of the questionnaire took two forms. Version A contained statements concerning the characteristics of the style of *music* in question, and these are presented in Table 17.3: Version B contained statements concerning the characteristics of the *fans* of the musical style in question, and these are presented in Table 17.4. The items in the two different versions were carefully worded such that a given statement regarding a characteristic of the music corresponded as closely as possible with a given statement regarding a characteristic of the fan. In both versions, subjects were asked to indicate the extent to which they agreed with each statement by assigning ratings on an 11-point Likert scale where 0 = 'disagree completely', and 10 = 'agree completely'. In the absence of previous research on this issue, the statements

employed were those that seemed intuitively likely to elicit differences between the styles.

Since each questionnaire concerned only *one* style of music, and employed only *one* version of Section 3, a 3 (musical style questionnaire group - chart pop, indie pop, classical music) x 2 (version of Section 3) independent subjects design was employed. Aside from relevant changes in the wording, the questionnaire did not vary between the three musical styles. Having consented to participate, subjects read printed instructions which were verbally reinforced by the experimenter. Subjects then completed the questionnaire at their own pace, requiring approximately 10 minutes.

Results

Stereotypical taste publics To test the hypothesis that stereotypes of the fans of indie pop, classical music, and chart pop exist in terms of differences in their perceived demographic status, a number of one-way independent subjects ANOVAs and chi-square tests were carried out on the data from Section 1 of the questionnaire.

A one-way independent subjects ANOVA and Tukey HSD tests were calculated to determine perceived differences between fans of the three musical styles on ratings of their religiosity. The result of this was significant ($F = 7.62$, d.f. = 2, 115, $p < 0.001$) with the Tukey test indicating that fans of classical music were perceived as significantly more religious than fans of chart pop (means = 4.95 and 3.38 respectively): the mean rating for fans of indie pop (mean = 4.08) did not differ significantly from either of these two other means.

A one-way independent subjects ANOVA and Tukey HSD tests were also calculated to determine perceived differences between fans of the three musical styles on ratings of their social class. The result of this was significant ($F = 20.24$, d.f. = 2, 116, $p < 0.001$) with the Tukey test indicating that fans of classical music were perceived as being of significantly higher social class (mean = 6.67) than fans of either chart pop (mean = 4.98) or indie pop (mean = 4.96). These latter two means did not differ significantly.

A series of chi-square tests was calculated to determine perceived differences between fans of the three musical styles on ratings of their age group, the stage at which they leave full-time education, and their gender. The obtained statistics were $chi^2 = 158.78$ (d.f. = 6, $p < 0.01$), $chi^2 = 66.70$ (d.f. = 4, $p < 0.01$), and $chi^2 = 40.57$ (d.f. = 2, $p <$

0.01) respectively. The observed frequencies pertaining to these three variables are presented in Tables 17.1a, b, and c respectively. In conjunction, the analyses in this section indicate clear differences between the perceived likely demographic characteristics of the fans of the three musical styles, and as such this indicates the existence of stereotypical taste publics.

Stereotypical taste cultures To test the hypothesis that musical preferences are stereotyped in the form of taste cultures, a one-way independent subjects ANOVA and Tukey HSD tests were calculated for each of the composers/performers cited in Section 2 of the questionnaire. These analyses were to determine perceived differences in the extent to which fans of indie pop, classical music and chart pop would like each composer/performer. The results of these analyses are presented in Table 17.2. This indicates that fans of each of the three styles were perceived as liking specific composers/performers associated with that style more than were the fans of the other styles. This indicates the stereotyping of musical preferences into taste cultures, such that a fan of a given style of music is not perceived as being a fan of music in general.

Characteristics of the music A series of one-way independent subjects ANOVAs and Tukey HSD tests was conducted on responses to Section 3 (Version A) of the questionnaire. This elicited ratings concerning the extent of subjects' agreement with a series of statements regarding the characteristics of a musical style. The results of these analyses are presented in Table 17.3. This indicates that different normative perceptions existed regarding each musical style for all but two of the musical characteristics.

Characteristics of the fans A series of one-way independent subjects ANOVAs and Tukey HSD tests were conducted on responses to Section 3 (Version B) of the questionnaire. This elicited ratings concerning the extent of subjects' agreement with a series of statements regarding the personality characteristics of fans of a musical style. The results of these analyses are presented in Table 17.4. This indicates that different normative perceptions existed concerning the fans of the three styles for all but one of the characteristics investigated.

Correspondence between the characteristics of the styles and the personality characteristics of the fans To determine the correspondence between the stereotyped characteristics of each musical style and the stereotyped characteristics of the fans of that style, a series of product-moment correlation coefficients was calculated. The

Age group	Indie pop	Classical	Chart pop
0 - 11 years	0	0	6
12 - 17 years	11	0	31
18 - 23 years	29	3	2
24+ years	0	37	1

Table 17.1a - Observed frequencies of the perceived most likely age group of the fans of three musical styles

Education level	Indie pop	Classical	Chart pop
After G.C.S.E	1	0	24
After 'A' level/BTEC	10	10	13
After university	29	29	3

Table 17.1b - Observed frequencies of the perceived stage at which the fans of three musical styles are most likely to leave full-time education

Sex	Indie pop	Classical	Chart pop
Male	28	21	2
Female	12	12	38

Table 17.1c - Observed frequencies of the perceived most likely sex of the fans of three musical styles

Composer/ performer	Musical style	Indie pop fans' mean liking	Classical music fans' mean liking	Chart pop fans' mean liking	F	d.f.	p
Cranes	Indie	6.89^{ab}	2.92^{a}	3.04^{b}	29.22	2,53	< 0.001
Echobelly	Indie	7.82^{ab}	3.31^{a}	3.85^{b}	50.85	2,78	< 0.001
Pavement	Indie	7.84^{ab}	2.06^{a}	2.92^{b}	74.03	2,58	< 0.001
Sebadoh	Indie	6.72^{ab}	2.80^{a}	3.16^{b}	10.77	2,37	< 0.001
Salad	Indie	7.44^{ab}	2.33^{a}	2.58^{b}	39.29	2,44	< 0.001
S.M.A.S.H	Indie	6.18^{ab}	1.61^{ac}	3.77^{bc}	22.64	2,68	< 0.001
Stereolab	Indie	6.50^{ab}	3.00^{a}	2.71^{b}	15.67	2,48	< 0.001
Senser	Indie	8.39^{ab}	2.10^{a}	3.08^{b}	60.64	2,65	< 0.001
Beethoven	Classical	3.10^{ab}	9.13^{ac}	1.00^{bc}	303.05	2,116	< 0.001
Bach	Classical	3.05^{ab}	9.30^{ac}	0.85^{bc}	365.39	2,114	< 0.001
Mozart	Classical	2.79^{ab}	9.50^{ac}	1.23^{bc}	329.13	2,115	< 0.001
Haydn	Classical	2.67^{ab}	8.66^{ac}	1.09^{bc}	212.53	2,96	< 0.001
Brahms	Classical	2.48^{ab}	8.82^{ac}	0.84^{bc}	366.34	2,106	< 0.001
Handel	Classical	2.50^{ab}	9.00^{ac}	0.87^{bc}	363.80	2,110	< 0.001
Debussy	Classical	2.78^{ab}	8.21^{ac}	1.07^{bc}	141.36	2,77	< 0.001
Schubert	Classical	2.63^{ab}	9.00^{ac}	1.03^{bc}	289.62	2,109	< 0.001
Wet Wet Wet	Chart	2.26^{ab}	5.10^{ac}	8.05^{bc}	119.04	2,114	< 0.001
Mariah Carey	Chart	2.16^{ab}	5.13^{ac}	7.38^{bc}	92.78	2,113	< 0.001
Let Loose	Chart	2.00^{a}	3.15^{b}	8.41^{ab}	103.20	2,79	< 0.001
Boyz II Men	Chart	1.16^{ab}	2.61^{ac}	8.33^{bc}	183.99	2,111	< 0.001
Bad Boyz Inc.	Chart	1.36^{a}	1.63^{b}	9.05^{ab}	257.75	2,110	< 0.001
D:Ream	Chart	3.21^{a}	2.36^{b}	8.56^{ab}	133.38	2,113	< 0.001
Luther Vandross	Chart	1.82^{ab}	5.03^{a}	5.44^{b}	41.96	2,114	< 0.001
All-4-One	Chart	0.97^{ab}	3.42^{ac}	8.00^{bc}	133.41	2,90	< 0.001

Within each variable, means marked by similar letters differ at the $p < 0.05$ level

Table 17.2 - One-way ANOVAs to determine three groups of fans' perceived liking for 24 composers/performers

Characteristic of the music	Indie pop mean	Classical music mean	Chart pop mean	F	d.f.	p
The attractiveness of the performer is important	2.65^{ab}	1.10^{ac}	8.65^{bc}	106.07	2,57	< 0.001
On average, the music is pro-establishment	2.84^{a}	3.58^{b}	6.15^{ab}	7.91	2,55	= 0.001
The music is usually upbeat and suitable for parties	4.35^{ab}	1.60^{ac}	7.95^{bc}	60.75	2,57	< 0.001
The music usually uses technology	4.55^{ab}	2.00^{ac}	7.25^{bc}	28.19	2,57	< 0.001
Women's rights are addressed in this music	5.00^{ab}	2.10^{a}	2.70^{b}	9.03	2,57	< 0.001
The music is often thought-provoking	6.60^{a}	6.70^{b}	1.75^{ab}	44.57	2,57	< 0.001
Usually, the music is overtly commercial	3.45^{a}	3.05^{b}	8.10^{ab}	30.18	2,57	< 0.001
The music often draws from Afro-American (as opposed to traditional European) culture	3.79^{ab}	1.55^{ac}	5.75^{bc}	19.48	2,56	< 0.001
The music is unconventional	3.15^{a}	4.95	6.80^{a}	8.24	2,57	< 0.001
The music in this style changes little over the years	5.10	4.90	4.10	0.88	2,57	= 0.42
The music addresses religious topics	5.35^{a}	5.15^{b}	1.60^{ab}	24.64	2,57	< 0.01
The music is complicated	4.15^{ab}	7.60^{ac}	1.90^{bc}	49.16	2,57	< 0.01
The music often contains a deeper meaning	6.55^{a}	6.75^{b}	2.75^{ab}	18.78	2,57	< 0.01
The music is usually listened to by whites rather than other races	6.40	5.45	4.70	1.85	2,57	= 0.17

Within each variable, means marked by similar letters differ at the $p < 0.05$ level

Table 17.3 - One-way ANOVAs to determine differences between the perceptions of three musical styles

Characteristic of the fans	Indie pop mean	Classical music mean	Chart pop mean	F	d.f.	p
Physical attractiveness is important to them	4.65^{a}	4.40^{b}	8.60^{ab}	20.81	2,57	< 0.001
On average, they are pro-establishment	2.60^{ab}	6.05^{a}	4.80^{b}	16.03	2,57	< 0.001
It is important to them to spend a large amount of their time having fun	6.90^{a}	4.95^{ab}	8.35^{b}	15.27	2,57	< 0.001
They see technology as a good thing	4.10^{ab}	5.75^{a}	6.90^{b}	10.79	2,57	< 0.001
Women's rights are important to these people	7.25^{a}	5.95^{b}	4.20^{ab}	10.60	2,57	< 0.001
They enjoy thinking about things	5.65^{ab}	7.75^{ac}	3.40^{bc}	15.54	2,57	< 0.001
They think it is important that people like them	4.30^{a}	4.80^{b}	8.25^{ab}	14.52	2,57	< 0.001
They generally favour American (as opposed to traditional European) culture	4.70^{ab}	1.55^{ac}	7.30^{bc}	29.41	2,57	< 0.001
They are unconventional	5.85^{a}	4.40	2.65^{a}	5.74	2,57	< 0.01
They are fond of tradition and may be sceptical about new ways	2.85^{a}	6.30^{ab}	2.95^{b}	14.47	2,57	< 0.001
They are religious	3.05^{a}	5.30^{ab}	2.95^{b}	9.77	2,57	< 0.001
They are sophisticated	3.75^{a}	6.80^{ab}	2.80^{b}	13.82	2,57	< 0.001
They enjoy music with a deeper meaning	7.25^{a}	7.95^{b}	2.20^{ab}	51.03	2,57	< 0.001
They are more likely to be racist	2.35^{a}	3.10	4.25^{a}	2.95	2,57	= 0.06

Within each variable, means marked by similar letters differ at the $p < 0.05$ level

Table 17.4 - One-way ANOVAs to determine differences between the perceptions of the characteristics of fans of three musical styles

mean rating assigned to each of the 14 items in Versions A and B of Section 3 was calculated within each musical style questionnaire group x version combination. The product-moment correlation was calculated between the two sets of 14 ratings obtained within each musical style questionnaire group: since the wording of items in the two versions of Section 3 was similar, a positive correlation between ratings from the two versions should provide some indication that the stereotypical characteristics of each musical style correspond with the stereotypical characteristics of the fans of that style.

The correlation between mean ratings of the characteristics of indie pop and mean ratings of the characteristics of fans of indie pop was +0.28 (N = 14, n.s.). The correlation between mean ratings of the characteristics of classical music and mean ratings of the characteristics of fans of classical music was +0.55 (N = 14, $p < 0.05$). The correlation between mean ratings of the characteristics of chart pop and mean ratings of the characteristics of fans of chart pop was +0.87 (N = 14, $p < 0.001$). These statistics indicate a generally positive relationship between the stereotypical characteristics of a musical style and the stereotypical personality characteristics of the fans of that style. This relationship was not statistically significant in the case of indie pop.

Agreement on the nature of the stereotypes In order to determine the internal consistency of subjects ratings, and therefore their level of agreement over the stereotypes obtained, a split-half reliability analysis was performed within each musical style questionnaire group on the ratings assigned to Section 2 of the questionnaire. Subjects were alternately assigned to one of two sub-groups within each musical style questionnaire group, and the mean rating for each of the 24 composers/performers was calculated within each subgroup. The product-moment correlation was then calculated between the two sets of 24 ratings obtained from each musical style questionnaire group. This procedure was repeated for Section 3 of the questionnaire. That is, subjects were alternately assigned to one of two sub-groups within each musical style questionnaire group x version combination, and the mean rating on each of the 14 variables was calculated within each subgroup. The product-moment correlation was then calculated between the two sets of 14 ratings obtained from each musical style questionnaire group x version combination. The coefficients resulting from these analyses ranged between +0.80 and +0.98 (N = 24 for Section 2 analyses and N = 14 for Section 3 analyses, $p < 0.01$ in all cases). Therefore, subjects' stereotyping was consistent within Sections 2 and 3.

Discussion

The results provide some evidence that subjects held clear, consensual, stereotypes in the domain of musical taste such that musical style labels convey implicit information concerning not only the music itself but also the people that listen to that music. In short, stylistic labels served as a 'badge' concerning the likely characteristics of the music and its fans. Indeed, musical taste was stereotyped in several ways. First, stereotypes existed regarding the demographic status of the fans of each musical style: clear differences emerged concerning the perceived age, sex, socioeconomic class, education, and religiosity of fans of each of the three musical styles, indicating the existence of stereotypical taste *publics*. Second, fans of a given musical style were perceived as disliking other styles of music: knowing that someone is a fan of one musical style does not lead to that person being perceived as a fan of composers/ performers drawn from all three of the three musical styles employed. This indicates the existence of stereotypical taste *cultures*.

Third, stereotypes existed concerning the characteristics of each of the three musical styles: significant differences emerged between the styles on 12 of the 14 statements regarding characteristics of the music. Fourth, stereotypes existed regarding the characteristics of the fans of each of the musical styles: significant differences emerged between subjects' ratings of the three groups of fans for all but one of the 14 statements regarding personality characteristics of the fans. Fifth, although the two versions of Section 3 of the questionnaire considered either characteristics of the musical styles *or* characteristics of the fans of these styles, the similarity of their wording allowed investigation of the correspondence between characteristics of the music and the characteristics of the fans. Correlational analysis indicated that, within each musical style, the perceived characteristics of the music corresponded with the perceived characteristics of the fans, although this was non-significant in the case of indie pop. It should be noted, however, that it is difficult to be certain of the correspondence in meaning between the wording of the two versions of Section 3, such that the above conclusion must be regarded as only tentative.

Finally, split-half reliability analyses on the data from Section 2 and the two versions of Section 3 of the questionnaire indicated that a very high level of internal consistency existed between subjects on the nature of the stereotypes they held regarding these items. In conjunction, these analyses suggest that people's stereotyping of musical taste may be a very pervasive phenomenon: consensual stereotypes existed

in terms of the perceived musical taste, demographic status, and characteristics of the fans, and also the perceived characteristics of the musical styles.

Future research could take at least four courses. First, it is possible and perhaps probable that different sub-groups of people at different times will hold different stereotypes regarding music, such that the present results provide only a 'snapshot' of the stereotyping of musical taste. In short, there is perhaps no single stereotype for any given musical style or its fans, and any attempt to describe such a definitive stereotype might well be limited by the sample from which it was obtained. However, future studies could investigate variations in stereotyping between different subject populations. For example, do the fans of musical styles always perceive themselves more positively than they perceive the fans of other styles (i.e. favouring an in-group to an out-group) ?

Secondly, as noted above, social psychological research on stereotyping demonstrates the influence of stereotypical beliefs on several aspects of information-processing: would the processing of music be similarly influenced by stereotypes ? For example, it would be interesting to investigate how the stereotypes indicated here relate to the prestige effects on responses to music described in the previous Chapter: perhaps Chapman and Williams' (1976) results came about because progressive rock music was perceived generally as more 'sorrowful', 'interesting', and 'weird' than was 'serious music'. In the context of the research reported in Part B of the thesis, it would also be particularly interesting to investigate the association between the stereotypes described here and responses to an environment in which music is played. For example, would a shop be perceived as more sophisticated if it played classical music rather than chart pop, and would this cause shoppers to consider and perhaps even buy more expensive items ?

Thirdly, the stereotypes presented here could be employed to extend research into the effects of self-to-prototype matching on choice behaviour. Burke and Reitzes (1981) found that the overlap between an individual's self-concept and a consensually defined prototype of the type of person who enjoys certain types of social activity could reliably predict preferences in entertainment activities. Could a similar self-to-prototype matching process be related to preferences for musical styles, such that people listen to a particular style because their self-concept or ideal self corresponds with the stereotype of the person who typically listens to that style ? Finally, it would be interesting to investigate the extent to which the stereotypes demonstrated here

correspond with actual differences between the people who listen to different musical styles: music may serve as an actual as well as a stereotypical 'lifestyle badge'.

In conclusion, the present research indicates that perceptions of music, and the people who listen to that music may not be based solely on a reasoned, logical assessment of the specific piece or fan in question: rather, pre-existing, generalised knowledge structures exist which allow people to make inferences concerning the likely characteristics of musical styles and their fans. As such, musical stereotypes may be a piece of extra-musical information that listeners bring with them to real-world musical experiences. The following chapter concerns another of these extra-musical pieces of information that are present in much of our everyday music listening, namely the physical attractiveness of the performer.

Chapter 18. The Effect of Physical Attractiveness on Responses to Pop Music Performers and Their Music

Another important extra-musical feature of music listening in the late 20th century is that through television, magazines, and newspapers, the listener is now often aware of how a given performer *looks* as well as sounds. This is particularly the case within the pop music industry, which spends large sums of money every year on presenting its artists in an attractive light, presumably on the assumption that this will cause the public to buy more pre-recorded music. Moreover, this technique is beginning to also be employed in the marketing of classical music, with artists such as Vanessa Mae and Lesley Garrett being promoted in terms of their physical attractiveness (see e.g. Landesman, 1996). Despite this, little is known about the effects of the physical attractiveness of music performers on responses to both them and their music, and the present research sets out to provide some initial exploratory evidence on this. In short, does performer physical attractiveness provide influential extra-musical information in subjects' responses to musical stimuli ?

One possible means by which performers' physical attractiveness may be influential is through some form of prestige effect. Several studies reviewed in Chapter 16 indicate that responses to musical stimuli can be mediated by variations in their status. If variations in performers' physical attractiveness are associated with variations in their status, then this factor may influence responses to the performer and his/her music.

A large number of studies carried out in the late 1960s and early 1970s provide a considerable body of evidence that physical attractiveness influences responses to people and that we respond more favourably to physically attractive than unattractive people, such that attractiveness does indeed incur higher status. For example, Dion, Berschied, and Walster (1972) presented subjects with a series of photographs of people which were then rated on several scales. Physically attractive people were perceived as possessing more socially desirable personality traits (e.g. 'sensitive', 'sincere', 'poised'), and as having more successful lives (e.g. judged as 'more competent as a spouse', and 'more likely to be happily married'). Similarly, Miller (1970) presented male and female subjects with photographs that had been scaled previously as low, moderate or high in physical attractiveness. Subjects then recorded their impression of each photograph on an adjective checklist, and found that on 15 of the 17 adjective scales, the low attractiveness photographs were associated with undesirable impressions.

Walster, Aronson, Abraham, and Rottmann (1966) paired male and female undergraduates at a dance, and found that physical attractiveness was 'by far the largest determinant' (p. 208) of how much a partner was liked, how much subjects wanted to date their partner, and how often subjects actually asked their partners for a date. Dion (1972) manipulated the report cards of school children so that they contained a photograph of an attractive or unattractive child who had allegedly carried out either a severe or a minor transgression. The physical attractiveness of the child had no effect on adult subjects' responses to the mild transgression, but when the report concerned a severe transgression more antisocial chronic behavioural dispositions were attributed to the physically unattractive children than their attractive counterparts. In conjunction, studies such as these provide clear evidence of a physical attractiveness stereotype such that attractive people are perceived more positively than unattractive people. As the German writer Schiller (1882) put it, 'Physical beauty is a sign of an interior beauty, a spiritual and moral beauty', or as Dion et al (1972) put it more bluntly in the title of their paper, 'What is beautiful is good'.

Two studies provide some limited evidence that music and physical attractiveness may indeed be directly related. Zillman and Bhatia (1989) presented subjects with a videotape of a potential heterosexual date, and manipulated this tape in terms of the stated musical style preference of the date. This disclosure influenced the attractiveness of the person so that, for example, the date's stated liking for country music decreased his/her attractiveness to subjects of both genders. Stated liking for heavy metal increased the attractiveness of male dates but decreased the attractiveness of female dates: in contrast, stated liking for classical music increased the attractiveness of female dates but had the opposite effect for males. Also, male subjects were attracted more strongly to female dates with whom they shared a musical preference, although this effect was negligible for female subjects.

Similarly, May and Hamilton (1980) asked female subjects to evaluate photographs of attractive and unattractive males whilst listening to music of positive affect (rock), negative affect ('avant-garde'), or no music. Although attractive males were evaluated more positively on a variety of measures (e.g. 'intelligence' and 'morality'), these evaluations were more positive for males presented in the presence of rock as compared with the avant-garde music. The effects of music were explained in terms of an association between the photographs and the stimulus situation.

This brief review of the literature indicates that responses to music can be affected by manipulations of the status of the source, that there is a physical attractiveness

stereotype whereby attractive people are perceived more positively than unattractive people (i.e. they enjoy a higher status), and that music and physical attractiveness do appear to be related in some respects. In light of this, it is plausible that responses to pop music performers may be affected by their physical attractiveness, such that attractive performers should be perceived more positively than unattractive performers. Moreover, if manipulations of source prestige can influence responses to music, then subjects should respond more positively to music allegedly performed by physically attractive rather than unattractive artists. To test these ideas, the present study investigated the effect of performer physical attractiveness on responses to both pop music performers and their music.

Male and female subjects were played 20 musical excerpts, and shown a slide projection of the alleged composer and performer of each. In different sessions, each of the 20 excerpts was attributed to either an attractive male (AM), attractive female (AF), unattractive male (UM), or unattractive female (UF) performer. Subjects then rated either each excerpt or each performer on 12 adjectival scales. More positive ratings should be assigned to attractive performers and the pieces they allegedly composed and performed than should be assigned to *un*attractive performers and the pieces they allegedly composed and performed. Furthermore, if music becomes associated with people in its environment, as May and Hamilton suggest, then there should be a positive correlation between responses to the performers and responses to the music allegedly by them. At the end of the study, subjects rated the extent to which attractive and unattractive male and female performers were each 'likely to be manipulated by the music industry', and were 'likely to be involved with the music industry just for the money they could make out of it'. Intuition suggests that these ratings should show that physically attractive performers are not always perceived positively.

The study also allows the investigation of the effect of gender in relation to attractiveness, since both the gender of the performer and subject may well be expected to mediate any effects of attractiveness. Several studies have shown that gender may influence affective and evaluative responses to a variety of stimuli. For example, Paludi and Strayer (1985) found that an academic article allegedly written by a male was valued more positively than one allegedly by a female. However in a meta-analysis of similar types of studies, Swim, Borgida, Maruyama, and Myers (1989) showed that the average difference between responses to allegedly male and female authors was negligible, although Top (1991) argues in a review article that such gender effects may 'depend upon characteristics of the stimulus object or person,

characteristics of the judges and judgement situation, and the way in which judgements are provided' (p. 73). On the basis of this, it seems reasonable to at least suspect that gender may be a salient variable in the present study.

Method

Pilot study Approximately 150 photographs were obtained from pop music record companies, radio stations, and public relations companies. Each of the photographs was a professional publicity shot, and featured a single pop music performer. Three months before carrying out the main study, the photographs were presented to a panel of 4 (2 male, 2 female) students from the educational establishment in which the main study took place. The students were asked to select from these photographs the 5 most attractive males, the 5 most attractive females, the 5 most unattractive males, and the 5 most unattractive females. The only condition applying to their selections was that the person in the photograph should be credible as a performer of ambient/dance music (i.e. the pop music style employed in the main study). The pilot study was carried out by the same male and female experimenters that carried out the main study. The students were not informed of the purpose of their task, and were asked by the experimenters and their class teacher not to discuss what they had done with other students. Informal discussions with the pilot subjects (and their fellow students) during de-briefing at the end of the main study confirmed that they had adhered to this request. The four students involved in the pilot study were ineligible as subjects for the main study.

Subjects 48 further education students (24 males, 24 females) took part in the main study. Their mean age was 16.54 years (s.d. = 0.67, range = 16-18 years). To provide further information on the sample, a panel of three independent judges assessed a self-report of musical training and experience made by subjects, and determined that 23, 12, and 13 subjects possessed low, intermediate, and high levels respectively. All the subjects were recruited from a further education college located in the suburbs of a city in the East Midlands region of the U.K.

Experimental stimuli The 20 photographs selected in the pilot study were made into projector slides, and 20 excerpts of non-vocal ambient/dance music were also selected for the study (see Appendix 18.1). This style of music was employed because of its current popularity with British adolescents; because it was relatively easy to obtain excerpts with no vocal content; because recordings within this style are typically made by individual artists rather than groups; and because it is the style in which performer

attractiveness is perhaps most obviously employed by the music industry as a marketing tool. Each excerpt was of 30 seconds duration, and two separate excerpt orderings were recorded from the original versions onto a cassette. The specific excerpts were selected so that they were unlikely to be known by the subjects, thus ensuring that their responses would not be contaminated by previous experiences of the stimuli.

Design Subjects rated either the musical excerpts or the performers, and were assigned randomly to these two conditions. Within each session, ratings were assigned on 0-10 scales for 'poised', 'sophisticated', 'masculine', 'innovative', 'emotionally warm', 'feminine', 'intelligent', 'sensitive', 'likely to be popular', 'profound', and 'artistic merit' (or when rating the performer, 'how much artistic merit this person's music is likely to possess'). In addition to these scales, subjects rating the music were asked to rate their 'liking' for each excerpt, and subjects rating the performers were asked to rate how 'physically attractive' each was. On these scales, 0 represented 'not at all' (or 'none' for ratings concerning artistic merit) and 10 represented 'very' (or 'very much' for ratings of liking for the music and artistic merit). The scales were selected so that they could be reasonably expected to apply to both music and music performers, and were taken or adapted from previous studies of physical attractiveness effects. Five different orderings of the rating scales were employed within subjects.

At the end of the study, subjects rated AM, AF, UM, and UF performers on scales from 0 ('not at all') to 10 ('very') for the extent to which they were each 'likely to be manipulated by the music industry', and the extent to which they were each 'likely to be involved with the music industry just for the money they could make out of it'. These two sets of ratings were made in response to verbal labels (e.g. 'attractive males') rather than a specific set of visual stimuli.

Four presentation orderings of the slides were employed so that each musical excerpt was paired between sessions with an AM, AF, UM, and UF performer in both the music-rating and performer-rating conditions. Subject gender was counterbalanced throughout, and all the sessions were carried out by the same pair of male and female experimenters. Subjects were asked to mark any ratings given when they recognised either the musical excerpt or the performer. Only one subject recognised one of the musical excerpts, and her ratings of this excerpt were disregarded. At the end of the session this subject was informed of the purpose of the experiment, and indicated that she had not realised the deception involved since she did not know what the true

performer of the excerpt looked like: her responses to other excerpts were consequently retained.

Procedure Subjects were tested in groups of 6 (3 male, 3 female) in a small quiet room within the college from which they were recruited. The sessions were conducted during free periods. Subjects followed a written set of instructions which were verbally reinforced by the experimenter. These asked subjects to listen carefully to each musical excerpt, and to look at the screen situated at the front of the room on which they would see a picture of the person that composed and performed each. The rating scales were explained, and subjects were asked not to give any ratings until the end of the excerpt in question. Two practice excerpts and performers were then presented and rated to allow subjects to become accustomed to the rating scales: these ratings were not included in the analyses. The 20 experimental excerpts and performers were then presented and subjects gave their ratings. Subjects were allowed as long as was necessary to give their ratings, typically requiring approximately one minute for each excerpt/performer. Once all 20 excerpts or performers had been rated, subjects were asked to rate the extent to which AM, AF, UM, and UF performers were likely to be 'manipulated by the music industry', and also to be 'involved with the music industry just for the money they could make out of it'. Subjects were then thanked but not de-briefed until the study was completed. They were also asked not to discuss the experiment with fellow students, and informal discussions with the subjects, other students, and class teachers during de-briefing confirmed that subjects had adhered to this request.

Results and Discussion

Responses to the performers A 2 (attractive versus unattractive performer) x 2 (male versus female performer) x 2 (male versus female subject) MANOVA was carried out on subjects' ratings of the performers on the 12 rating scales. This gave rise to a significant multivariate main effect of performer attractiveness ($F = 26.77$, d.f. = 12, 459, $p < 0.001$), which indicates that physical attractiveness influenced responses to the performers. 7 of the 12 rating scales gave rise to univariate main effects, and these significant univariate results are summarised in Table 18.1.

Attractive performers were perceived as more 'poised', 'sophisticated', 'emotionally warm', 'feminine', 'intelligent', and 'likely to be popular' than were unattractive performers. In addition to this, those who were termed as 'attractive' performers by the pilot subjects were rated as significantly more so than those who were termed

Rating scale	Mean for attractive performers	Mean for unattractive performers	F	p
Attractive	7.57	4.41	305.58	< 0.001
Poised	5.77	4.93	34.12	< 0.001
Sophisticated	5.54	4.68	21.30	< 0.001
Emotionally warm	5.91	5.34	13.41	< 0.001
Feminine	5.29	4.19	23.31	< 0.001
Intelligent	5.93	5.60	4.74	< 0.05
Likely to be popular	5.62	4.58	29.77	< 0.001

d.f. = 1, 470 in all cases

Table 18.1 - Summary of univariate main effects of performer attractiveness on responses to the performer

'unattractive', and this validates the proposed manipulation of performer attractiveness. There were no differences between attractive and unattractive performers on ratings of 'how much artistic merit this person's music is likely to possess', and the extent to which the performers were perceived as 'masculine', 'innovative', 'sensitive', and 'profound', which indicates that attractive performers were not always perceived positively.

The MANOVA also revealed a number of other significant main effects and interactions. These are of less interest to the aims of the present research than the physical attractiveness main effects, and so are covered in only the briefest detail. There was a multivariate main effect of performer gender ($F = 21.68$, d.f. = 12, 459, $p < 0.001$), which indicates that this variable did influence responses to the performers. However, this was attributable to the large differences between male and female performers on ratings of the extent to which they were both 'masculine' and 'feminine' ($F = 199.09$, d.f. = 1, 470, $p < 0.001$; and $F = 204.79$, d.f. = 1, 470, $p < 0.001$ respectively), with means of 6.15, 2.85, 3.03, and 6.43 assigned to male and female performers on these measures respectively. There were no other significant univariate main effects of performer gender. There was also a significant multivariate main effect of subject gender ($F = 9.25$, d.f. = 12, 459, $p < 0.001$) with significant univariate main effects on 5 of the 12 rating scales, and these significant univariate results are summarised in Table 18.2. These indicate that male subjects assigned significantly higher ratings than females on the extent to which the performers were perceived as 'attractive', 'poised', 'sophisticated', 'innovative', and 'emotionally warm'. These results are difficult to explain, although the main effect of subject gender should not have biased any of the other analyses since this factor was counterbalanced throughout the experiment.

There were significant univariate performer attractiveness x subject gender interactions on ratings of the performers for how 'likely they are to be popular', and 'how much artistic merit this person's music is likely to possess' ($F = 4.08$, d.f. = 1, 470, $p < 0.05$; and $F = 3.84$, d.f. = 1, 470, $p = 0.05$ respectively). The means for these interactions are plotted in Figures 18.1 and 18.2 respectively, and indicate that on both variables, female subjects were more tolerant of unattractiveness than were male subjects. The multivariate interaction between these factors was not significant, and neither were the remaining univariate analyses.

A significant univariate performer gender x subject gender interaction was found on ratings of the extent to which the performers were perceived as 'emotionally warm'

Rating scale	Mean for male subjects	Mean for female subjects	F	p
Attractive	6.20	5.71	9.15	< 0.01
Poised	5.66	5.01	19.17	< 0.001
Sophisticated	5.76	4.48	45.14	< 0.001
Innovative	5.42	4.55	23.73	< 0.001
Emotionally warm	5.81	5.42	6.00	< 0.02

d.f. = 1, 470 in all cases

Table 18.2 - Summary of univariate main effects of subject gender on responses to the performer

Figure 18.1 - The Interaction Between Performer Attractiveness and Subject Gender on Ratings of the Extent to which the Performers are 'Likely to be Popular'

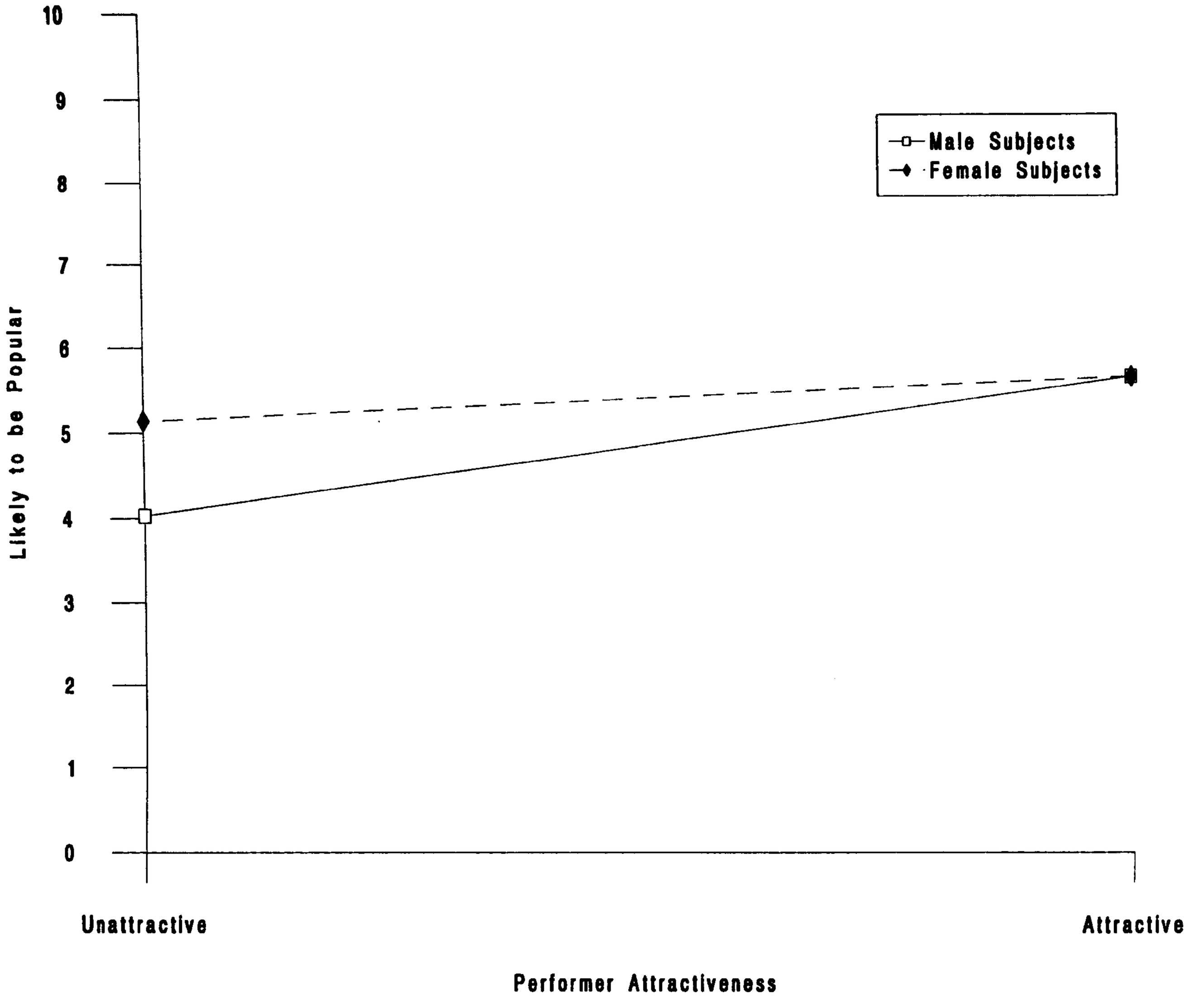
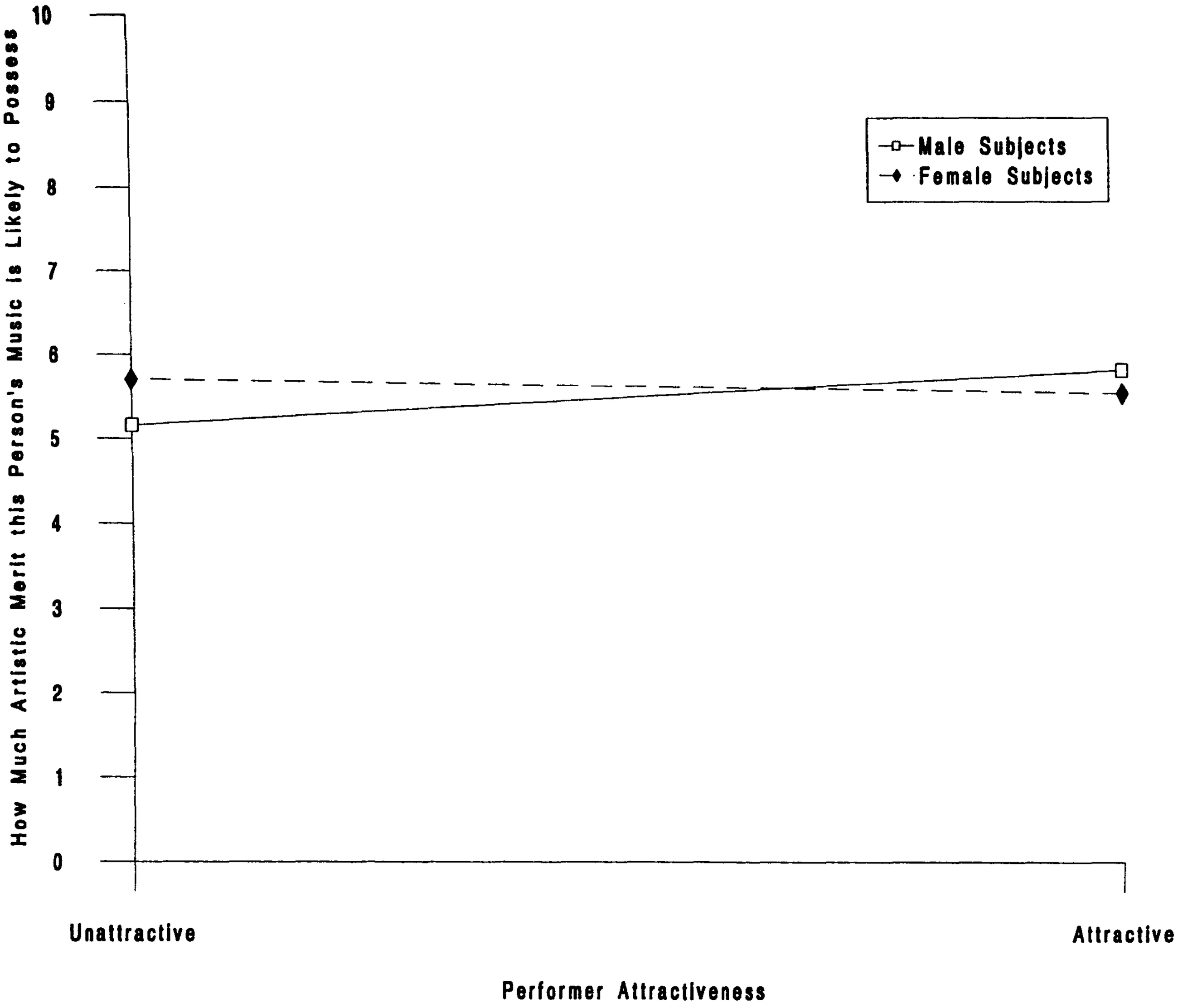


Figure 18.2 - The Interaction Between Performer Attractiveness and Subject Gender on Ratings of 'How Much Artistic Merit this Person's Music is Likely to Possess'



($F = 4.45$, d.f. = 1, 470, $p < 0.05$). The means for this interaction are plotted in Figure 18.3. These means indicate that male subjects assigned higher ratings to female performers than did female subjects, whilst male and female subjects assigned similar ratings to male performers. The multivariate interaction between these factors was not significant, and neither were the remaining univariate analyses.

Significant performer attractiveness x performer gender interactions were found on ratings of the extent to which the performers were 'masculine' ($F = 8.26$, d.f. = 1, 470, $p < 0.01$) and 'feminine' ($F = 5.34$, d.f. = 1, 470, $p < 0.05$). The means for these interactions are plotted in Figures 18.4 and 18.5 respectively. AM performers were rated as more 'masculine' than UM performers whereas AF performers were rated as less 'masculine' than their UF counterparts. It is interesting to compare this with the latter interaction, which suggests that AF performers were rated as more 'feminine' than their UF counterparts. Again, the multivariate interaction between these factors was not significant, and neither were the remaining univariate analyses. It is also worth noting that none of the possible three-way interactions between performer attractiveness, performer gender, and subject gender attained statistical significance.

<u>Responses to the music</u> A 2 (attractive versus unattractive performer) x 2 (male versus female performer) x 2 (male versus female subject) MANOVA was carried out on subjects' ratings of the musical excerpts on the 12 rating scales. This gave rise to a significant multivariate main effect of performer attractiveness ($F = 2.95$, d.f. = 12, 433, $p = 0.001$), which indicates that the physical attractiveness of the performer influenced responses to the music. 5 of the 12 rating scales gave rise to univariate main effects, and these significant univariate results are summarised in Table 18.3.

Music allegedly by attractive performers was liked more, perceived as possessing more 'artistic merit', and as being more 'sophisticated', 'intelligent', and 'likely to be popular' than was music allegedly by unattractive performers. However, there were no differences between music allegedly by attractive and unattractive performers on ratings of the extent to which it was 'poised', 'masculine', 'innovative', 'emotionally warm', 'feminine', 'sensitive', or 'profound', which indicates that music by attractive performers was not always perceived positively.

There was a significant multivariate main effect of performer gender ($F = 2.04$, d.f. = 12, 433, $p = 0.02$), which indicates that this variable also influenced responses to the music. This was attributable to univariate main effects on ratings of the extent to which the excerpts were perceived as 'masculine' and 'feminine' ($F = 9.54$, d.f. = 1,

Figure 18.3 · The Interaction Between Performer Gender and Subject Gender on Ratings of the Extent to which the Performers are 'Emotionally Warm'

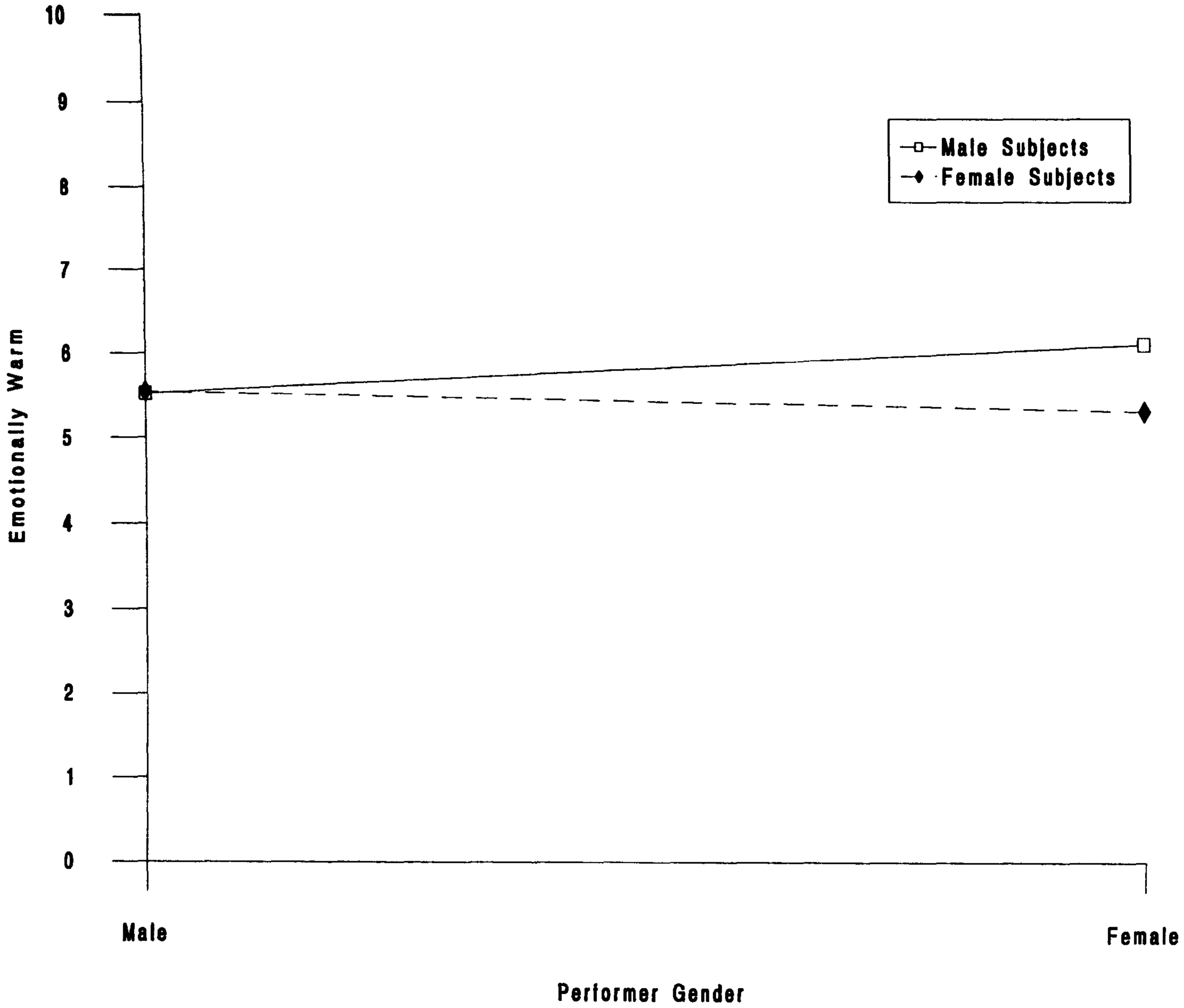


Figure 18.4 - The Interaction Between Performer Attractiveness and Performer Gender on Ratings of the Extent to which the Performers are 'Masculine'

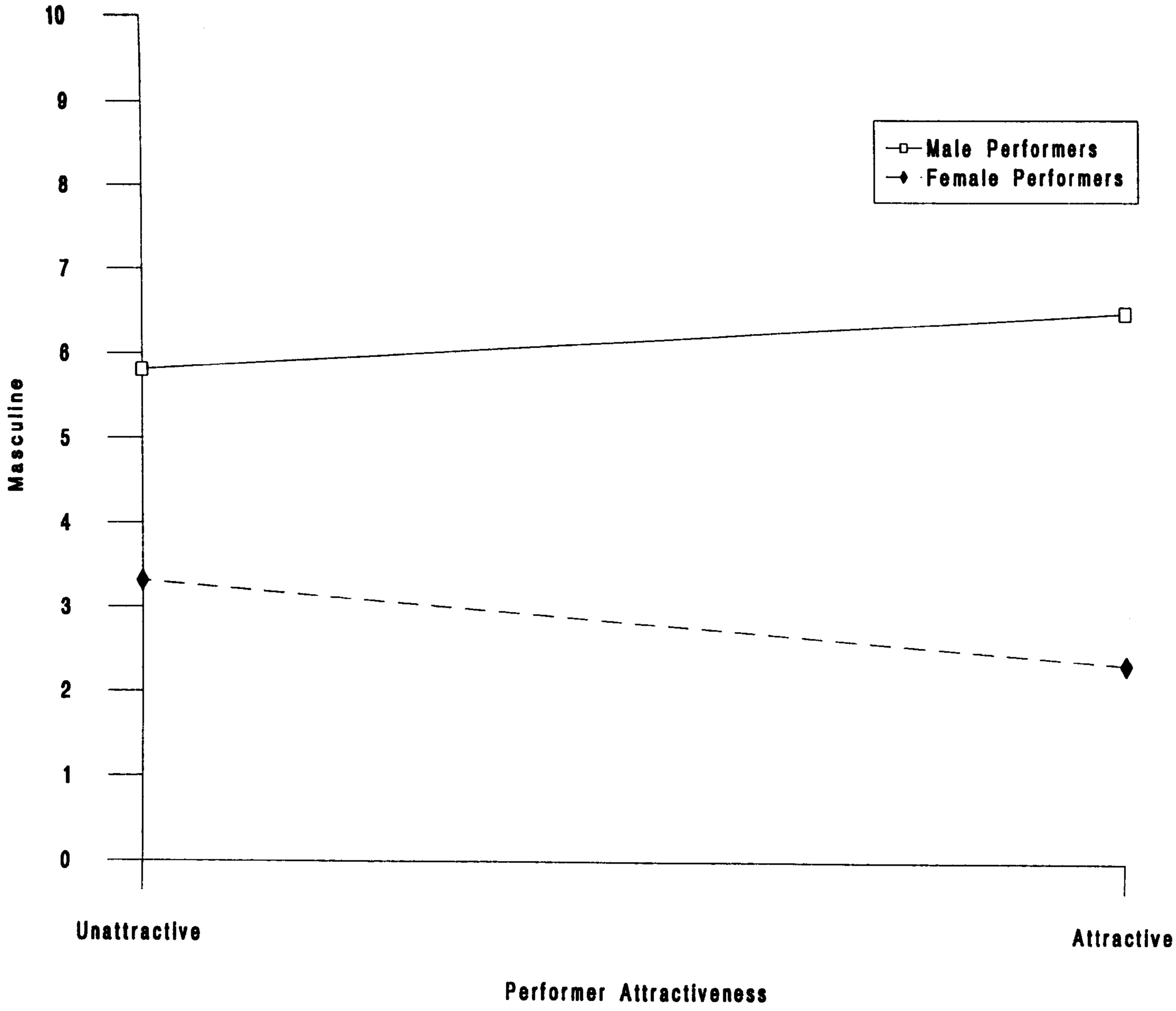
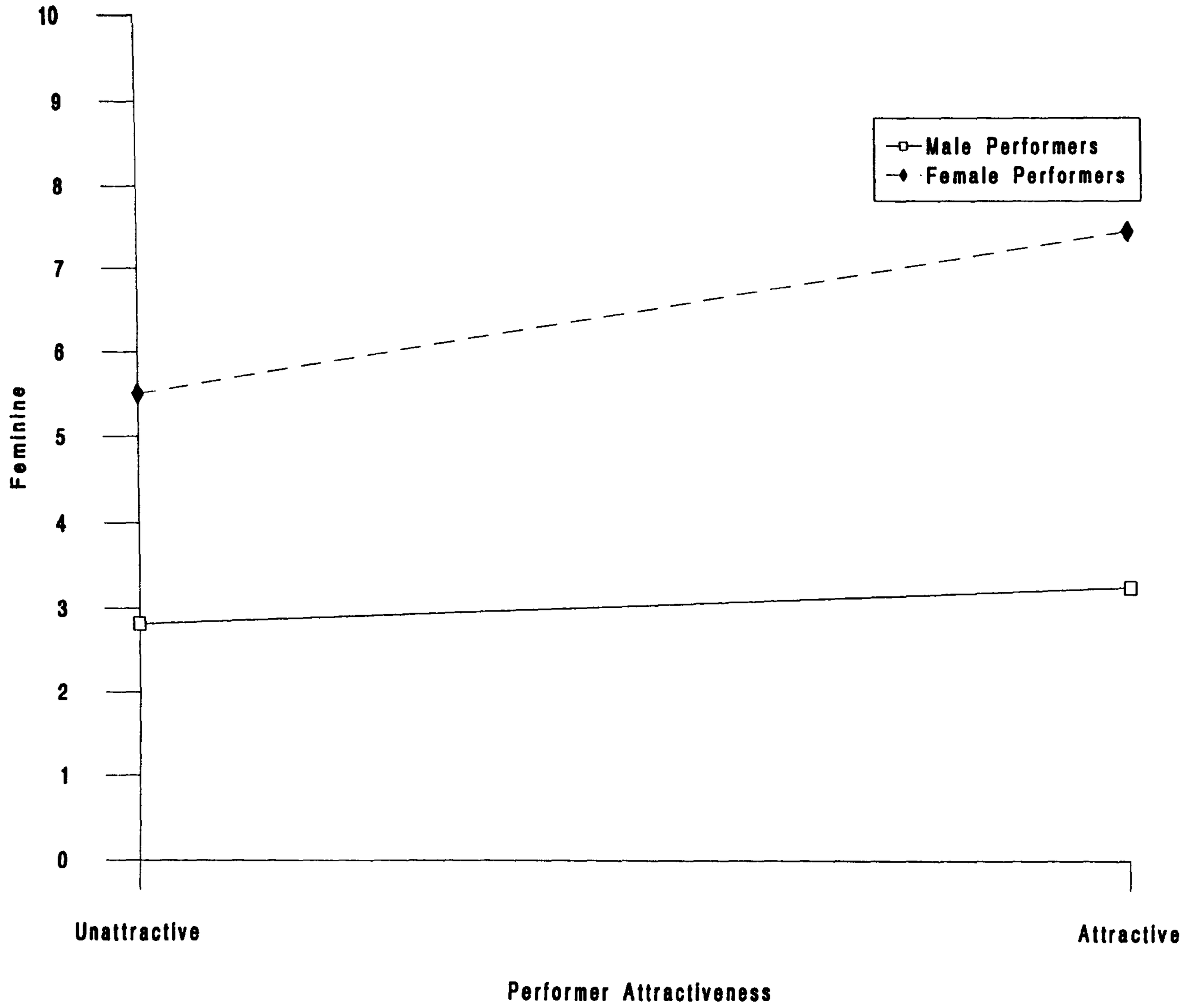


Figure 18.5 - The Interaction Between Performer Attractiveness and Performer Gender on Ratings of the Extent to which the Performers are 'Feminine'



Rating scale	Mean for attractive performers	Mean for unattractive performers	F	p
Liking	5.23	4.06	25.92	< 0.001
Sophisticated	5.87	5.39	5.79	< 0.02
Intelligent	5.93	5.54	5.48	= 0.02
Artistic merit	6.10	5.46	11.88	= 0.01
Likely to be popular	4.87	3.76	27.74	< 0.001

d.f. = 1, 444 in all cases

Table 18.3 - Summary of univariate main effects of performer attractiveness on responses to the music

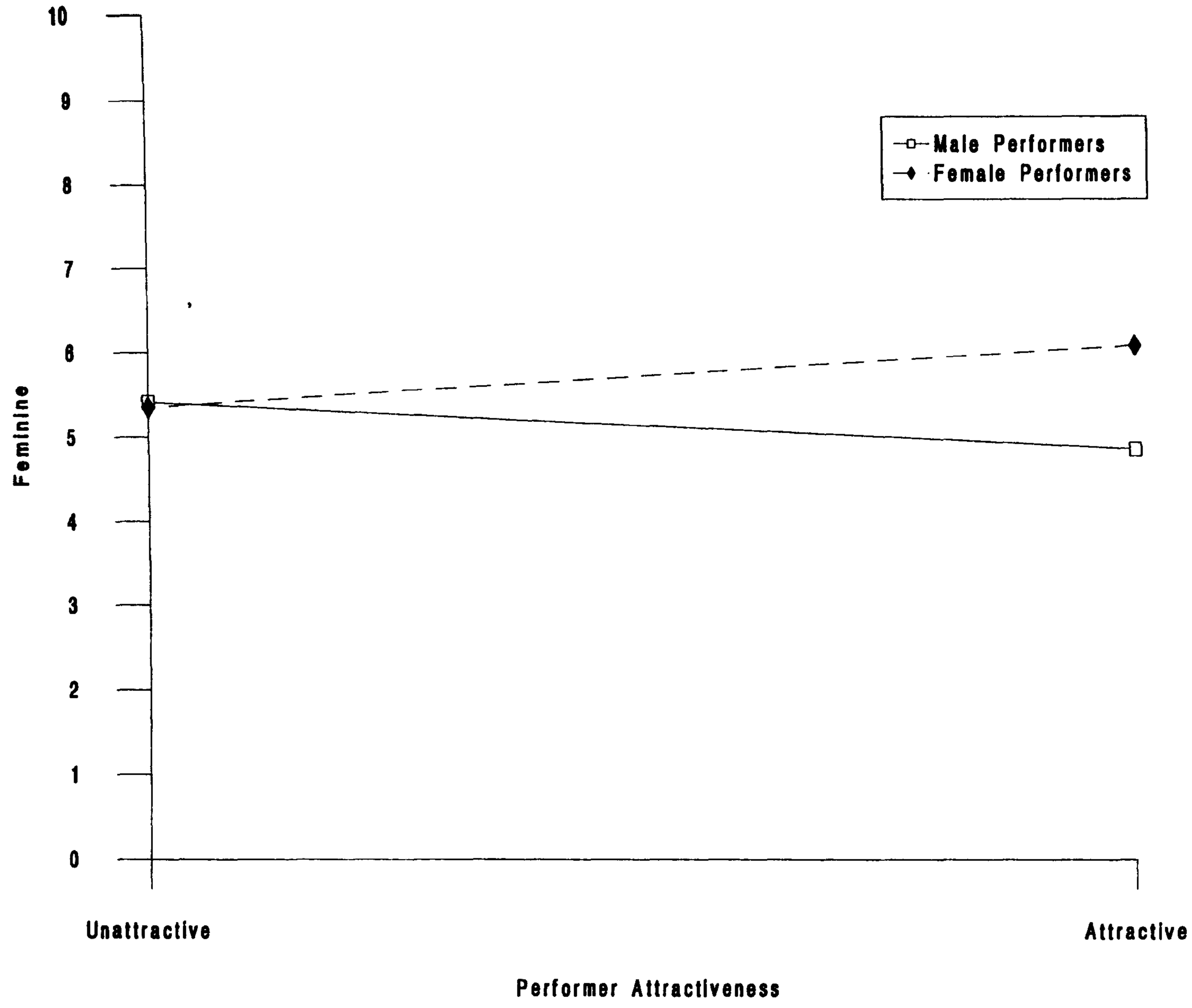
444, $p < 0.01$; and $F = 7.58$, d.f. = 1, 444, $p < 0.01$ respectively). Means of 4.50, 3.84, 5.13, and 5.71 were assigned to music allegedly by male and female performers on these measures respectively. That is, music by male performers was perceived as more 'masculine' and music by female performers was perceived as more 'feminine'. The remaining univariate main effects of performer gender were all non-significant.

Only two other results within this MANOVA achieved statistical significance. A univariate main effect of subject gender was found on ratings of the extent to which the excerpts were 'innovative', with male subjects assigning higher ratings than female subjects ($F = 4.15$, d.f. = 1, 444, $p < 0.05$, means = 5.41 and 5.06 respectively). There was also a significant univariate performer attractiveness x performer gender interaction on the extent to which the excerpts were rated as being 'feminine' ($F = 10.63$, d.f. = 1, 444, $p = 0.001$), with the means for this being plotted in Figure 18.6. Music by AF performers was perceived as more 'feminine' than music by UF performers, whereas there was little difference on this measure between UM and AM performers.

Relationship between responses to performers and their music A product-moment correlation was calculated between mean ratings of each of the performers and mean ratings of the excerpts when they were attributed to each of those performers. This allowed an investigation of the relationship between responses to each of the performers and responses to the music allegedly by each of them. The correlation was carried out across all the performers and all the rating scales, with the exception of those for performer attractiveness and liking for the music. The resulting coefficient was +0.38 ($N = 220$, $p < 0.001$), which indicates that responses to the performers were related positively to responses to their music.

The product-moment correlation was then calculated between mean ratings of the attractiveness of each of the performers and ratings of liking for the music associated with each of the performers. The result of this was +0.79 ($N = 20$, $p < 0.001$) which indicates that musical preference was associated closely with the physical attractiveness of the performers. This analysis was then repeated within each of the remaining rating scales, and the following scales gave rise to significant results with $N = 20$ in all cases; 'poised' ($r = +0.54$, $p < 0.02$), 'sophisticated' ($r = +0.48$, $p < 0.05$), 'sensitive' ($r = +0.45$, $p < 0.05$), and 'likely to be popular' ($r = +0.82$, $p < 0.001$). It is perhaps also worth noting that the correlation for 'emotionally warm' approached statistical significance ($r = +0.40$, $p = 0.08$).

Figure 18.8 - The Interaction Between Performer Attractiveness and Performer Gender on Ratings of the Extent to which the Music was 'Feminine'



Likelihood of being manipulated and musical involvement for financial reasons Two one-way repeated measures ANOVAs were carried out to investigate differences between AM, AF, UM, and UF performers in terms of the extent to which they were perceived as being 'likely to be manipulated by the music industry', and 'likely to be involved with the music industry just for the money they could make out of it'. The results of these were $F = 64.29$, d.f. = 3, 141, $p < 0.001$; and $F = 15.94$, d.f. = 3, 141, $p < 0.001$ respectively. The mean ratings assigned to AM, AF, UM, and UF performers on these two measures were 7.62, 8.25, 4.31, 4.13; and 7.04, 6.96, 5.56, 5.19 respectively. Subsequent Tukey HSD tests indicated that higher ratings were assigned to attractive performers on both of these measures, and this suggests that physical attractiveness is not always perceived positively since attractive performers were perceived as more 'likely to be manipulated by the music industry', and 'more likely to be involved with the music industry just for the money they could make out of it'.

Summary and Conclusion

The results indicate that physical attractiveness affected responses to pop music performers and their music, with significant multivariate main effects for performer attractiveness on both sets of ratings. These were brought about by significant univariate main effects which indicated that attractive performers were perceived as more 'poised', 'sophisticated', 'emotionally warm', 'feminine', 'intelligent', and 'likely to be popular' than their unattractive counterparts, and that music performed by attractive performers was liked more, perceived as possessing more 'artistic merit', and as being more 'sophisticated', 'intelligent', and 'likely to be popular' than music performed by their unattractive counterparts. In essence, variations in attractiveness meant that the performers and their music were perceived differently, although it should be noted that physical attractiveness did not have a significant influence on all the rating scales. In conjunction with the correlation between the physical attractiveness of the performer and liking for the excerpts, these results correspond with earlier, more general research on the implications of physical attractiveness: the 'what is beautiful is good' rule (Dion et al, 1972) may also apply to pop music and its performers.

The results also suggest a possible exception to this. Although physical attractiveness was generally regarded positively, attractive performers were perceived as more 'likely to be manipulated by the music industry' and more 'likely to be involved with the industry just for the money that they could make out of it'. They may be more socially desirable people who produce better music, but physically attractive performers are also perceived as subject to more machiavellian motives. One speculative explanation

of this finding is that physical attractiveness is perceived less positively when it is made more overt. Until they responded to these particular items, subjects had been assigning ratings in the presence of performers who happened to differ in their attractiveness: in contrast, when responding to the items discussed here subjects were not presented with individuals but rather with an unspecified group of people who had been labelled as 'attractive' or 'unattractive'.

Correlations provided some evidence of a relationship between responses to the performers and responses to music allegedly by those performers. Also, if the correlational and MANOVA results are taken as a whole, then the data suggest that the physical attractiveness of the performer mediated the nature of these correlations: that is, responses to the musical excerpts were generally related to responses to their alleged performers, and both these sets of responses were mediated by the performers' physical attractiveness.

It is also interesting that these influences showed few interactions with subject gender and/or performer gender (and this was particularly so for the three-way interactions and the multivariate statistics): rather the effect of performer attractiveness seemed generally to transcend gender boundaries. Also, it is difficult to interpret those main effects and interactions involving subject or performer gender that did arise, since they appeared to follow no discernible or readily explicable pattern. The only general conclusion that can be made on the basis of these particular results is that subject and performer gender may also produce some extremely specific effects on particular rating scales. Whilst this is of interest in its own right, the findings do seem to be overshadowed somewhat by the more readily interpretable main effects of performer attractiveness. Perhaps the one exception to this concerned the main effect of performer gender on ratings of the extent to which the musical excerpts were perceived as 'masculine' or 'feminine': excerpts allegedly by males were perceived as more 'masculine', and excerpts allegedly by females were perceived as more 'feminine'. This is interesting, since it again suggests that characteristics of the performer influenced the perceived characteristics of the music allegedly by that person.

It seems appropriate to suggest a few topics which future research in this area could investigate, given the lack of previous studies. The most obvious need is for more detailed theoretical work on *why* performer's physical attractiveness should mediate responses to their music. At the moment it is only possible to speculate that some associative process is in operation, such that attractive performers enjoy higher status

and this makes their music more prestigious. However, intuition if nothing else suggests that this may well be rather simplistic, and some possible follow-up studies might provide a more sophisticated approach to the issue.

First, it would be interesting to attempt to replicate these findings with other musical styles. Would jazz or classical music, for example, be subject to a performer attractiveness effect given that these styles (at least compared with pop music) perhaps place less emphasis on presentational and promotional aspects ? Second, to what extent would the present findings be replicated when the visual stimulus of the performer is not present, e.g. when we hear a record on the radio that we know is by an attractive performer ? Third, there may be a developmental aspect to the effects of physical attractiveness that perhaps reflects different age groups being differentially susceptible to specific performers as a result of varying standards of what constitutes physical attractiveness. Fourth, could the potentially positive effects of physical attractiveness be reduced when the performer makes this too overt or over-exaggerated by for example appearing largely unclothed (although what exactly constitutes over-exaggeration could well vary between different perceivers) ? Finally, could other variations in the performer's appearance influence responses to music ? For example, it is possible that their clothing (e.g. leather jackets, baseball caps) may influence the extent to which the music is perceived as representing one style rather than another. Musical style, the presence of the attractive image, subjects' age, the overtness of physical attractiveness, and other features of the performer's appearance may all prove to have a further influence beyond that demonstrated here.

In the meantime however, these findings provide some evidence that physical attractiveness affects responses to pop music performers and their music, such that this variable may be a relevant contextual feature of our musical behaviour. More simply, in addition to stereotypes, the physical attractiveness of the performer is another piece of extra-musical information that may be salient in real-world responses to music. The following part of the thesis considers two more general extra-musical factors that may be related to responses to music in the real-world, namely acculturation and normative perceptions of musical eminence.

Part D. Eminence and Acculturation

Chapter 19. Eminence and Acculturation

Parts B and C have shown that responses to music are not made in a 'social vacuum', but are instead subject to the influence of extra-musical, social psychological factors. Up to this point in the thesis, these factors have concerned the influence of the *immediate* social psychological environment on musical preference. Part D of the thesis builds on this, concerning variables that operate on a broader cultural level, and looks in particular at musical eminence, and the development of musical preference and knowledge across the lifespan. The purpose of this chapter is to briefly review the existing literature on this.

Perhaps the best known research within this area was carried out by Paul Farnsworth (see Farnsworth, 1950; 1969) between the 1930s and 1960s. This work investigated consensus on the nature of musical taste and how this evolves over time, and employed a series of measures derived from public polling and music archives. For the former measures, Farnsworth's typical method was to send a list of the names of between 100 and 200 classical music composers to members of the American Musicological Society (A.M.S.). The members were asked to 'mark those composers whose works deserved to be called to the attention of others and preserved as part of our musical heritage'. Farnsworth allocated the responses alternately to one of two sub-groups on the basis of the order in which they were returned. By correlating the data from the two sub-groups, he was able to establish the degree of consensus on musical taste within his sample.

Farnsworth also investigated the issue of consensus by drawing on the vast resources of data available in music archives. For example, he measured the amount of space allocated to the different composers in histories of music, music encyclopaedias, and general encyclopaedias; the frequency with which the composers' works were played by a symphony orchestra; the number of times the composers' works were played on the radio; and the frequency with which the composers' works were recorded. This rich data base enabled Farnsworth's conclusions to possess a much greater degree of ecological validity than many other studies of musical taste.

By these means, Farnsworth established that there was general consensus on the relative eminence of composers, with the same small number of individuals (e.g. Beethoven, Brahms, and Mozart) continually receiving the highest measures in both split halves of given sets of data (e.g. encyclopaedia space allocations or A.M.S. members' eminence selections). Furthermore, Farnsworth (1950) reports a high level

of correspondence between the results from different ways of measuring musical eminence (e.g. between A.M.S. members' ranking of composers for eminence and the frequency with which orchestras played the composers' works). The correlation coefficients between these measures were typically greater than +0.75 and frequently in excess of +0.90, which led Farnsworth to conclude that 'We agree on the composers we call eminent' (1950, p. 7), and that 'We agree on what we enjoy' (1950, p. 10).

In support of this, Price, Yarbrough, and Kinney (1990) more recently found a positive correlation between the number of performances of pieces by specific composers and the frequency with which these composers were perceived to be 'eminent' by members of university music theory and composition faculties. Furthermore, two studies from outside the musical domain seem to corroborate Farnsworth's conclusions. Gordon (1923) presented two groups of subjects with pictures of oriental rugs, and found a close correspondence between the two groups' choices. Similarly, Clow (1946) demonstrated that professors of English agreed closely on the relative eminence of English literature authors, and that different encyclopaedias allocated similar amounts of space to these authors.

In some related work, Farnsworth (1969) investigated historical trends in the eminence of classical music composers. For example, he tested the popular idea that taste in classical music is governed by some sort of 'reverence for the past', such that the most eminent composers are those that have been dead the longest. His data revealed a form of 'reverence for the intermediate past', in that those composers who had been dead for an intermediate period (approximately 150 years) were rated as more eminent than those in the more distant or more recent past. In a similar vein, Farnsworth (1969) reported on the correlation between musicologists' eminence rankings of composers obtained in 1938, 1944, 1951, and 1964. Whilst there were generally high correlations between the rankings from each of these years, the magnitude of the correlations decreased as the temporal distance between the rankings became more extreme. There were also some interesting trends for specific composers with for example, Palestrina's position in the rankings decreasing over the years, Haydn's increasing, and Brahms' increasing and then decreasing (see Table 19.1).

This corresponds with some earlier research by Mueller and Hevner (1942), who investigated American orchestral programs between 1876 and 1941. One of their most interesting findings was that the frequency with which different composers' works were performed tended to demonstrate a gradual waxing and waning rather than continuous rises or continuous falls: 'Each composer has a life cycle' (p. 108). For

Rank	1938	Rank	1944	Rank	1951	Rank	1964
1	Bach	1	Bach	1	Beethoven	1	Bach
2	Beethoven	2	Beethoven	2	Bach	2	Beethoven
3	Wagner	3	Mozart	3	Brahms	3	Mozart
4	Mozart	4	Wagner	4	Haydn	4	Haydn
5	Palestrina	5	Haydn	5	Mozart	5	Brahms
6	Haydn	6.5	Brahms	6.5	Schubert	6	Handel
7	Brahms	6.5	Palestrina	6.5	Debussy	7	Debussy
8	Monteverdi	8	Schubert	8	Handel	8	Schubert
9	Debussy	9	Handel	9	Wagner	9	Wagner
10	Schubert	10	Debussy	10	Palestrina	10	Chopin
11	Handel	11	Chopin	11	Chopin	11	Monteverdi
12	Chopin	25	Monteverdi	15	Monteverdi	12	Palestrina

Table 19.1 - Eminence rankings by musicologists in four different years (adapted from Farnsworth, 1969)

example, over the period investigated, Wagner started high in popularity, declined in the late 1880s, rose to second place in 1910, and then declined again: it is quite possible that Farnsworth's data on musical trends (see Table 19.1) was capturing sections of these 'life cycles'.

In explaining their results, Mueller and Hevner cite a number of cultural factors that may mediate the nature of cyclical vogues. Firstly, contemporary events influenced the music performed by the orchestras: for example, the First World War produced a decrease in the number of German works performed, and a corresponding increase for French and American works (see also Farnsworth's data on the pre- and post-World War 2 position of Wagner in Table 19.1). Similarly, the rate of turnover in the works performed reflected the amount of new music available: the declining frequency with which Beethoven's works were performed was 'practically equal' (p. 103) to the increase in the performance of modern composers' works. Furthermore, they argue that the works performed by the orchestras reflected not only public taste but also that of the conductor, with the employment of a new conductor being associated with radical changes in orchestras' output. 'Such extraneous influences ... reflected themselves repeatedly and convincingly' (p. 103). They end their study by saying that 'Trends ... can no longer be esoteric and mystical' (p. 109), and it is worth noting that these kinds of finding are akin to those of three smaller scale studies by Ortmann (1932), Price (1990), and Zipf (1946). Martindale (1990) also provides some evidence of such trends in the context of his evolutionary theory of the arts, and similarly, one feature of the preference-feedback hypothesis (see Chapter 1) is that over time, there should be a continual waxing and waning in the popularity of artworks.

A more recent research programme within this approach is being carried out by Dean Simonton in California. The central feature of this approach is the use of computers, which has allowed Simonton to construct very large databases which frequently contain information on not a *sample* of musical stimuli, but more typically a substantial proportion of the entire classical repertoire. For example, Simonton (1980; 1984) investigated 15,618 themes by 477 classical composers spanning the period from the Renaissance to the mid-20th century. It is this potential for large and highly representative data sets that constitutes the principal advantage of such archival approaches over the experimental techniques employed in the previous three parts of the thesis.

Simonton's highly innovative research has yielded several fascinating findings concerning eminence in classical music (see reviews by Simonton, 1994; Simonton, in

press). These findings have largely addressed creative productivity (Simonton, 1977; 1986a; 1991), and have shown that the strongest predictor of musical eminence is a high output rate. However, Simonton has identified several other relevant factors in eminence, such as available role models, an early start to specialised musical training, and a tendency to continue composing until the end of life. Other research by Simonton concerning geographical influences on productivity is reviewed briefly in Chapter 20.

Given the apparent promise of research along these lines, it is perhaps rather regrettable that so little has concerned styles other than classical music. However, two archival studies relevant to this part of the thesis have been carried out on pop music. Meenaghan and Turnbull (1981) employed a variety of archival measures (e.g. radio airplay, record sales) to investigate the marketing concept of the 'product life cycle' in the context of successful pop singles. The central feature of this was that successful records moved through 5 stages in a typically 16 week long period between their release and final abandonment by the music industry. In stage 1 ('pre-release'), songs and artists were selected by the music industry for their likely market performance. The second stage ('buzz-creation') was short, occurring just before and during release, and was characterised by promotion by the record company in an attempt to persuade TV and radio stations that the song was not 'a risk' (see also Rothenbuhler, 1985; Rothenbuhler and McCourt, 1992). Stage 3 ('pre-threshold') occurred between release and entry into the charts, and was characterised by the media deciding whether to feature the song: such exposure was a crucial determinant of, and *preceded* variations in, record sales (see also Erdelyi, 1940). Stage 4 ('commercial life', i.e. the time spent on the chart) was approximately 11 weeks long. During the early weeks of this stage, radio airplay was the most important determinant of sales, and was used as a guide to which songs should receive TV exposure. If a song reached the Top 20 then it tended to receive television coverage, and this then became more closely associated with sales than radio airplay, with the latter declining in importance as this stage progressed. The fifth stage ('final decline') corresponded with falling sales, and was very short. Sales were often negligible within only 3 weeks of a song leaving the chart, although the speed of this decline tended to correspond with that of the earlier sales increase. It would obviously be interesting to investigate the generalisability of these findings.

Dixon (1982) considered how variables taken from the Billboard top 200 chart could predict the waxing and waning in popularity of 234 LPs. Records generally entered the charts at low positions, and this entry position was a strong (and often the best)

predictor of how high they climbed, how long they sustained their peak popularity, how long they remained on the chart after peaking, whether they went 'gold', and whether there were other records by the same artist currently on the charts. However, records took roughly the same amount of time to achieve their peak position irrespective of chart entry position. Entry and peak chart position were enhanced by prior hit singles from the LPs, although there was no similar effect on peak chart position when singles were taken from the LPs after the release of the latter. Third week chart position was the best predictor of peak chart position.

The two studies above provide some initial indication that record buying behaviour follows general patterns and rules that should be of interest not only to music psychologists, but also to the record industry. They also suggest that archival sources such as pop music charts may provide valuable data since they represent a rigorous, frequent (i.e. weekly), and large (i.e. nation-wide) measure of musical consumption that is accessible to academic researchers (see e.g. Hesbacher, Downing, and Berger, 1978). Also, record buying is a direct behavioural measure of musical preference, costing the buyer his/her time, effort, and money. Given their advantages, record charts may well be an extremely useful source of future data on musical preference, despite the commercial influences imposed upon them by the music industry.

In light of these arguments, this part of the thesis reports three studies which all concern some aspect of musical eminence and/or acculturation. Chapter 20 reports the results of a newspaper survey, and provides some data on eminence in pop and classical music, as well as films, paintings, novels, and plays. The data also allowed a preliminary investigation of temporal and geographical trends in the production of important artworks. Chapter 21 takes a more detailed approach to eminence in pop music by studying the eminence selections of 5 different age groups, and relating these to data from pop music encyclopaedias and record sales charts. Chapter 22 extends the developmental approach of the previous chapter by considering how musical preference and knowledge develop across the lifespan, and are perhaps influenced by acculturation.

Chapter 20. Affective and Evaluative Responses to the Arts

In the U.K. alone there are many newspaper columns, radio and television programmes, and specialist magazines devoted to arts criticism. The assumption upon which these are based is that there is consensus on taste, such that one person's judgements should be agreed upon by somebody else. Yet despite the frequency with which we refer to 'good' or 'bad' art, Chapter 19 indicates that there is little research (particularly outside the domain of classical music) on the extent to which people agree on eminent artists or artworks. The present study investigates consensus on the nature of artistic taste with data from a poll of readers of the British newspaper '*The Sunday Times*'.

In addition to this, the present study investigates a second issue, namely whether people actually like what they consider to be exemplars of high quality art. With regard to this, two experimental studies (Hargreaves, 1987-1988; Hargreaves, Messerschmidt, and Rubert, 1980) found very high positive correlations between ratings of 'liking' and 'quality' assigned to music. However, these studies are limited in that the experimental procedures allowed only a small number of pieces to be presented to subjects, and the results may not generalise to other art forms. One other notable finding of these studies on musical preference and quality is that judgements of these variables tend to 'fragment' to some degree. That is, despite the generally positive relationship between ratings of liking and quality, subjects tended to assign higher quality than liking ratings to stereotypically more prestigious musical styles (e.g. classical versus pop music), whereas they tended to assign higher liking than quality ratings to less prestigious styles (e.g. vice versa). Further research on the factors underlying this fragmentation in responses to artworks seems desirable.

A third issue that this study investigates concerns the ways in which responses to the arts evolve over time. We frequently hear phrases such as 'the golden age of cinema', 'the age of the novel', or 'the swinging sixties' which all seem to indicate the existence of certain historical periods associated with the production of important artworks. Farnsworth (1950; 1969) and Mueller and Hevner (1942) have provided some initial evidence on this for classical music, although there is a notable absence of such data within other artistic domains. In light of this, the present study investigates whether there are historical trends in other art forms, such that certain periods are perceived as more prestigious than others.

One final issue concerns the impact of geographical factors on aesthetic responses. This has also been under-researched, although Simonton (1986b) investigated two variables, namely 'melodic originality', which was defined in terms of the two-note transition frequencies within the first 6 notes of 1,935 compositions, and 'geographic marginality', which was defined in terms of the distance between the locale of a given one of the 172 composers investigated and that where most of his/her contemporaries were born. Simonton found that musical works produced by those composing in geographic regions near to centres of musical activity were more original than the works of those composing in more distant geographical areas. In an earlier study, Simonton (1977) also found that these provincial composers tended to be less prolific than their more centrally-located contemporaries. This indicates that simple geographical factors such as the country in which an artist is born may have an influence on artworks, and this deserves to be studied further.

These issues were investigated in an analysis of data from a survey published in '*The Sunday Times*'. This presented readers with 6 artistic categories (e.g. pop performer, painting etc.), and asked them to nominate their 'favourite' and the 'greatest' within each. On the basis of the literature reviewed above and in Chapter 19, there should be consensus within subjects' nominations; a correspondence between the frequency with which performers/works were nominated as favourite and greatest; and significant trends in the number of performers/works nominated from different periods of history. Finally, the data also allows an initial exploratory investigation of the relationship between an artist's country of birth and responses to his/her work.

Method

Subjects 1,098 completed questionnaires were returned. In response to a self-report measure of active involvement in the arts, 707 (64.4%) of the respondents stated an active involvement (such as playing a musical instrument) whereas 383 (34.9%) had no such involvement. Due to space limitations the questionnaire did not request the age or sex of respondents, although a 1995 survey by the newspaper determined that its readers comprised approximately equal numbers of males and females, and that 6 age groups between 15 and 65+ years, and four social classes (AB, C1, C2, and DE) were approximately equally represented.

Questionnaire and procedure The questionnaire was published in the arts section of the 12th March, 1995 edition of the British newspaper '*The Sunday Times*'. A brief paragraph at the top of the questionnaire asked readers to complete it candidly. The

questionnaire contained 14 items which asked readers to nominate 'their favourite' and 'the greatest' in each of the following categories; painting, piece of classical music, pop music performer, novel, play, and film. Two further questions asked readers to state their 'favourite' and the 'most important' art form. Respondents were then asked to return the questionnaire to the newspaper. A range of encyclopaedias was consulted to determine the year and country in which each pop music performer, or the creator of each nominated artwork was born. (It had proved impossible to reliably derive the year of production for each nominated artwork). In the case of films, the year and country of production was determined instead, since nominated works within this art form may have resulted from the contributions of several people. The principal sources for this were Berney (1993), Halliwell (1989), Hartnoll (1983), Larkin (1992), Mallett (1935), Osborne (1970), Ousby (1988), and Scholes (1970).

Results and Discussion

Consensus on taste Split-half reliability analyses investigated the degree of consensus in subjects' judgements for each of the 6 categories (e.g. pop performer, paintings etc.) on the questionnaire. Completed questionnaires were randomly allocated to one of two sub-groups, and separate calculations were carried out within each sub-group for the frequency with which each work or performer was nominated for both 'favourite' and 'greatest' items on the questionnaire. Product-moment correlations were calculated between these sub-groups, and the results of these are reported in Table 20.1.

Table 20.1 indicates firstly that there were highly significant correlations between the two sub-groups for both 'favourite' and 'greatest' nominations within each art form. This indicates that subjects' judgements of taste were consensual, and corresponds with Farnsworth's research on classical music. Table 20.1 also suggests that this degree of consensus was higher for subjects' 'greatest' than for their 'favourite' nominations, and this was confirmed by a repeated measures t-test between the correlations for 'favourite' and 'greatest' ($t = -3.66$, d.f. = 5, $p = 0.02$, mean favourite correlation = +0.70, mean greatest correlation = +0.93). This higher degree of consensus over the 'greatest' exemplars of an art form suggests that the criteria for greatness are more widely agreed upon than the criteria for an artwork simply being liked. Two further product-moment correlations showed that there was also a high degree of consensus between the two sub-groups in their nominations of 'favourite' art form ($r = +0.99$, $N = 34$, $p < 0.001$) and 'most important' art form ($r = +0.98$, $N = 32$, $p < 0.001$).

Art Form	Correlation between Favourite nominations	N	p	Correlation between Greatest nominations	N	p
Paintings	+0.53	557	< 0.001	+0.98	217	< 0.001
Pieces of classical music	+0.71	353	< 0.001	+0.72	186	< 0.001
Pop performers	+0.80	294	< 0.001	+0.96	137	< 0.001
Novels	+0.75	499	< 0.001	+0.98	216	< 0.001
Plays	+0.61	286	< 0.001	+0.99	121	< 0.001
Films	+0.77	456	< 0.001	+0.96	255	< 0.001

Table 20.1 - Product-moment correlations between two sub-groups for favourite and greatest nominations within each art form

Further analyses investigated the extent to which the degree of consensus in subjects' nominations was attributable to a core of elite works or performers. In addition to the data presented in Table 20.1, two further sets of product-moment correlations were calculated. The first set was between the two sub-groups for only the ten most frequently nominated works or performers within each art form. The second set of correlations was calculated between the two sub-groups with the exclusion of the ten most frequently selected works or performers within each art form. As with the data in Table 20.1, these two sets of correlations were calculated first for subjects' 'favourite' nominations and then for their 'greatest nominations'. These analyses indicated the degree of consensus between subjects' on both the top 10 and sub-top 10 most frequently nominated works for both 'favourite' and 'greatest' items within each art form.

One-way repeated measures ANOVAs were then calculated to test for differences between the three sets of correlations described above for both 'favourite' and 'greatest' nominations separately. The analysis for subjects' 'favourite' nominations was significant ($F = 6.02$, d.f. = 2, 10, $p = 0.01$). Tukey HSD tests indicated that there was significantly less consensus between subjects' 'favourite' nominations for the sub-top 10 most frequently nominated works or performers (mean correlation = +0.39) than there was for the total number of works and performers nominated (mean correlation = +0.70) or the 10 most frequently nominated works or performers (mean correlation = +0.77). An identical pattern of results was produced when the analysis was repeated for subjects' nominations of the 'greatest' works and performers, with mean correlations between the sub-groups of +0.48, +0.93, and +0.97 respectively for sub-top 10, the total number, and the 10 most frequently nominated works and performers ($F = 20.94$, d.f. = 2, 10, $p < 0.001$). These results indicate that the degree of consensus between subjects on the 'favourite' and 'greatest' nominations is highest for an elite number of works or performers, and diminishes significantly when this elite is ignored.

<u>The relationship between preference and perceived greatness</u> Product-moment correlations were calculated within each art form to investigate the degree of relationship between the frequency with which works were nominated as 'favourite' and 'greatest', and also the relationship between the frequency with which different art forms were nominated as 'favourite' and 'most important'. The results of these are presented in Table 20.2, which shows that highly significant correlations were found in each case. This indicates that preference is positively related to the perception of

Variables correlated	r	N	p
Favourite painting - Greatest painting	+0.25	686	< 0.001
Favourite classical music piece - Greatest classical music piece	+0.46	410	< 0.001
Favourite pop performer - Greatest pop performer	+0.77	324	< 0.001
Favourite novel - Greatest novel	+0.38	587	< 0.001
Favourite play - Greatest play	+0.64	329	< 0.001
Favourite film - Greatest film	+0.65	562	< 0.001
Favourite art form - Most important art form	+0.94	45	< 0.001

Table 20.2 - Product-moment correlations between frequency of selection of nominations as favourite and greatest

quality in art, and extends the findings of earlier experimental studies of musical stimuli. In short, people like what they consider to be art of high quality. It should also be noted that the correlation for paintings was quite low despite its statistical significance. One possible reason for this considerable 'fragmentation' of 'favourite' and 'greatest' judgements is that the two paintings selected most frequently as greatest ('The Sistine Chapel' with 217 votes, and 'The Mona Lisa' with 184 votes) were not amongst the 10 paintings selected most frequently as favourites (receiving only 6 and 8 nominations respectively).

Another possible reason for this fragmentation is that a large number of the paintings nominated as favourites did not receive any nominations as greatest. This reflects a trend evident within each of the 7 categories reported in Table 20.2, and was investigated further by means of a repeated measures t-test across all 7 categories between the number of works, performers, or art forms nominated as favourite and the number of works, performers (*or art forms*) nominated as greatest (*or most important*). The result of this was significant ($t = 4.86$, d.f. = 6, $p < 0.01$) with a mean of 357.66 works, performers, or art forms being nominated as favourites in each category, whilst a mean of only 170.29 works, performers (*or art forms*) were nominated as the greatest (*most important*) in each category. Since fewer works, performers (*and art forms*) were nominated as great (*or important*), this suggests that the subjects' criteria for greatness were harder to satisfy than their criteria for simply liking. The five works, performers, and art forms nominated most frequently within each category as 'favourite' and 'greatest' are shown in Table 20.3.

The apparent discrepancy between preference and judgements of greatness was examined further for subjects' nominations of favourite and most important art forms. Although 45 art forms were nominated in these two categories, only literature, architecture, television, and music received more votes for 'importance' than being the 'favourite' art form. The remaining art forms (including theatre, cinema, painting, ballet, and poetry) received more votes for being 'favourite' than for being the 'most important'. The obvious distinction between these two groups of artworks is that the former are encountered more frequently as part of our everyday lives, and this deserves to be followed up by future research.

Temporal trends Curvilinear regression analyses were carried out within each art form to investigate whether works produced in certain historical periods received more nominations than works produced at other times. Separate calculations were carried out for 'favourite' and 'greatest' nominations. The independent variable in these

	Favourite Painting		Greatest Painting
1	'Water Lilies' Monet	1	'The Sistine Chapel' Michelangelo
2	'The Fighting Temeraire' Turner	2	'Mona Lisa' Leonardo da Vinci
3	'Sunflowers' Van Gogh	3	'The Last Supper' Leonardo da Vinci
4	'The Hay Wain' Constable	4	'Guernica' Picasso
5	'The Scream' Munch	5	'The Night Watch' Rembrandt

	Favourite Piece of Classical Music		Greatest Piece of Classical Music
1	'The Four Seasons' Vivaldi	1	Beethoven's 9th Symphony
2	Beethoven's 9th Symphony	2	Beethoven's 5th Symphony
3=	Rachmaninov's 2nd Piano Concerto	3	'The Messiah' Handel
3=	Elgar's Cello Concerto	4	'1812 Overture' Tchaikovsky
5	'1812 Overture' Tchaikovsky	5	Mozart's Requiem

	Favourite Pop Performer		Greatest Pop Performer
1=	Elvis Presley	1	Elvis Presley
1=	The Beatles	2	The Beatles
3	Elton John	3	Frank Sinatra
4	Bob Dylan	4	Michael Jackson
5=	Frank Sinatra	5	Freddie Mercury
5=	Sting		

	Favourite Novel		Greatest Novel
1	'Pride And Prejudice' Jane Austen	1	'War And Peace' Leo Tolstoy
2	'The Lord Of The Rings' J.R.R. Tolkien	2	'Wuthering Heights' Emily Bronte
3	'Wuthering Heights' Emily Bronte	3	'Middlemarch' George Eliot
4	'Jane Eyre' Charlotte Bronte	4	'Great Expectations' Charles Dickens
5	'Emma' Jane Austen	5	'Jane Eyre' Emily Bronte

	Favourite Play		Greatest Play
1	'The Importance Of Being Earnest' Oscar Wilde	1	'Hamlet' Shakespeare
2	'Hamlet' Shakespeare	2	'King Lear' Shakespeare
3	'Macbeth' Shakespeare	3	'Macbeth' Shakespeare
4	'A Midsummer Night's Dream' Shakespeare	4	'Romeo And Juliet' Shakespeare
5	'King Lear' Shakespeare	5	'Othello' Shakespeare

	Favourite Film		Greatest Film
1	Casablanca	1	Citizen Kane
2	Gone With The Wind	2	Gone With The Wind
3	Dr. Zhivago	3	Casablanca
4	Some Like It Hot	4	Schindler's List
5	Lawrence of Arabia	5	Lawrence Of Arabia

Favourite Art Form	Most Important Art Form
1 Music	1 Music
2 Painting	2 Literature
3 Literature	3 Painting
4 Theatre	4 Cinema
5 Cinema	5 Theatre

Table 20.3 - The 5 most frequently nominated works, performers, and art forms

analyses was the year of birth of the pop music performers, the year of birth of the artists whose works were nominated, or the production year of nominated films. The dependent variable was the number of nominations assigned to pop music performers born in those years, the number of nominations assigned to works produced by artists born in those years, or the number of nominations assigned to films produced in those years. Linear, quadratic, and cubic models were fitted to these data, and the results for the best-fitted models are presented in Table 20.4. In this table, empty rows indicate those dependent variables for which no model approached two-tailed statistical significance (i.e. $p <= 0.10$), and the R^2 x 100 column represents the percentage of variance in the data accounted for by the best-fitted model. The analysis for 'Greatest Play' reported in Table 20.4 was repeated omitting nominations of Shakespeare's work (which attracted over 800 votes). This analysis failed to significantly fit any of the three models to the remaining data, and for this reason the significance of the 'Greatest Play' data presented in Table 20.4 is perhaps best regarded as subject to some distortion.

Table 20.4 indicates that 8 of the 12 dependent variables were fitted significantly, or near significantly (two-tailed) in the cases of Greatest Painting and Greatest Pop Performer, to one of the three trends tested. These significant trends are illustrated in Figures 20.1-20.7. Although these trends explained only small percentages of the variance in the data, they do nevertheless indicate that certain historical periods are more likely than others to yield notable artworks.

Geographical trends A series of one-way independent subjects ANOVAs was calculated to determine differences between countries in the year of birth of their citizens who were nominated in the pop music categories or who produced nominated artworks: in the case of films, the analyses employed the year in which the countries' nominated films were produced. Since the artworks/performers in question are those that were nominated by the public as being the countries' most notable ones, this analysis allows a preliminary investigation concerning whether different countries produce important art at different times. Given that the analyses aimed to investigate differences in countries' ability to simply produce *notable* artworks, subjects' 'favourite' and 'greatest' nominations were summed into a single dependent variable. Countries that had three or less works/performers nominated within a given art form were grouped into an 'Other' category. Also, if specific citizens had several works nominated then their birth year was entered into the analyses a corresponding number of times (e.g. five Jane Austen novels were nominated, and so her birth year was entered five times into the United Kingdom category for novels).

Nomination	Best-fitted Model	R^2 x 100	d.f.	F	p (two-tailed)
Favourite Painting					
Greatest Painting	Linear	6.75	45	3.40	= 0.07
Favourite Piece of Classical Music	Cubic	10.12	70	3.51	< 0.05
Greatest Piece of Classical Music	Cubic	15.85	41	3.87	< 0.05
Favourite Pop Performer	Cubic	27.08	59	4.90	= 0.01
Greatest Pop Performer	Cubic	11.60	46	2.39	= 0.10
Favourite Novel	Cubic	5.40	105	2.98	= 0.05
Greatest Novel					
Favourite Play					
Greatest Play	Quadratic	16.70	39	3.91	< 0.05
Favourite Film	Cubic	10.43	67	5.41	< 0.05
Greatest Film					

Table 20.4 - Summary of curvilinear regression analyses of the relationship between the year of artists' birth (or film production) and number of nominations

Figure 20.1 - The Relationship Between Painters' Year of Birth and the Number of 'Greatest' Nominations

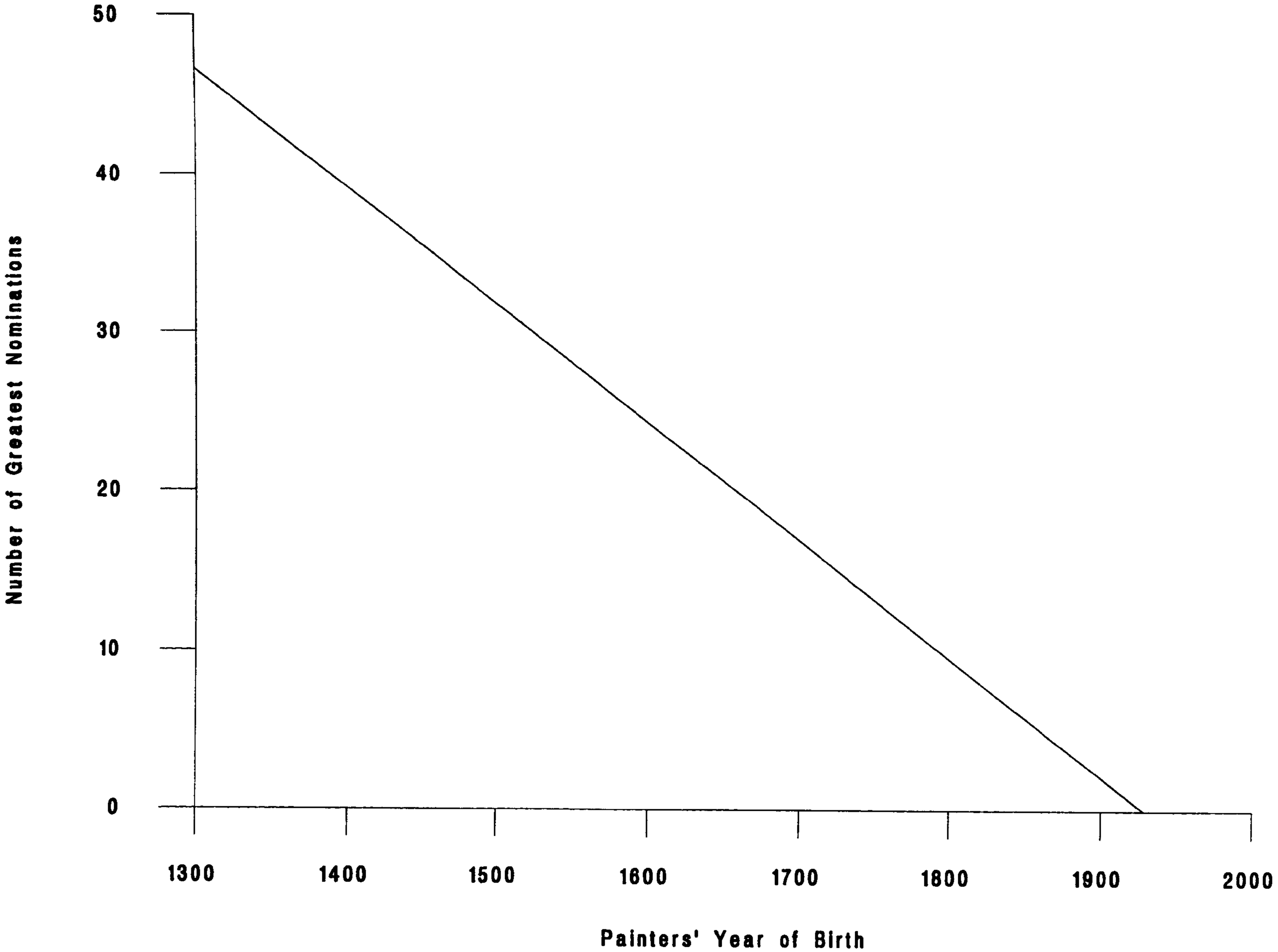


Figure 20.2 - The Relationship Between Classical Music Composers' Year of Birth and Number of 'Favourite' Nominations

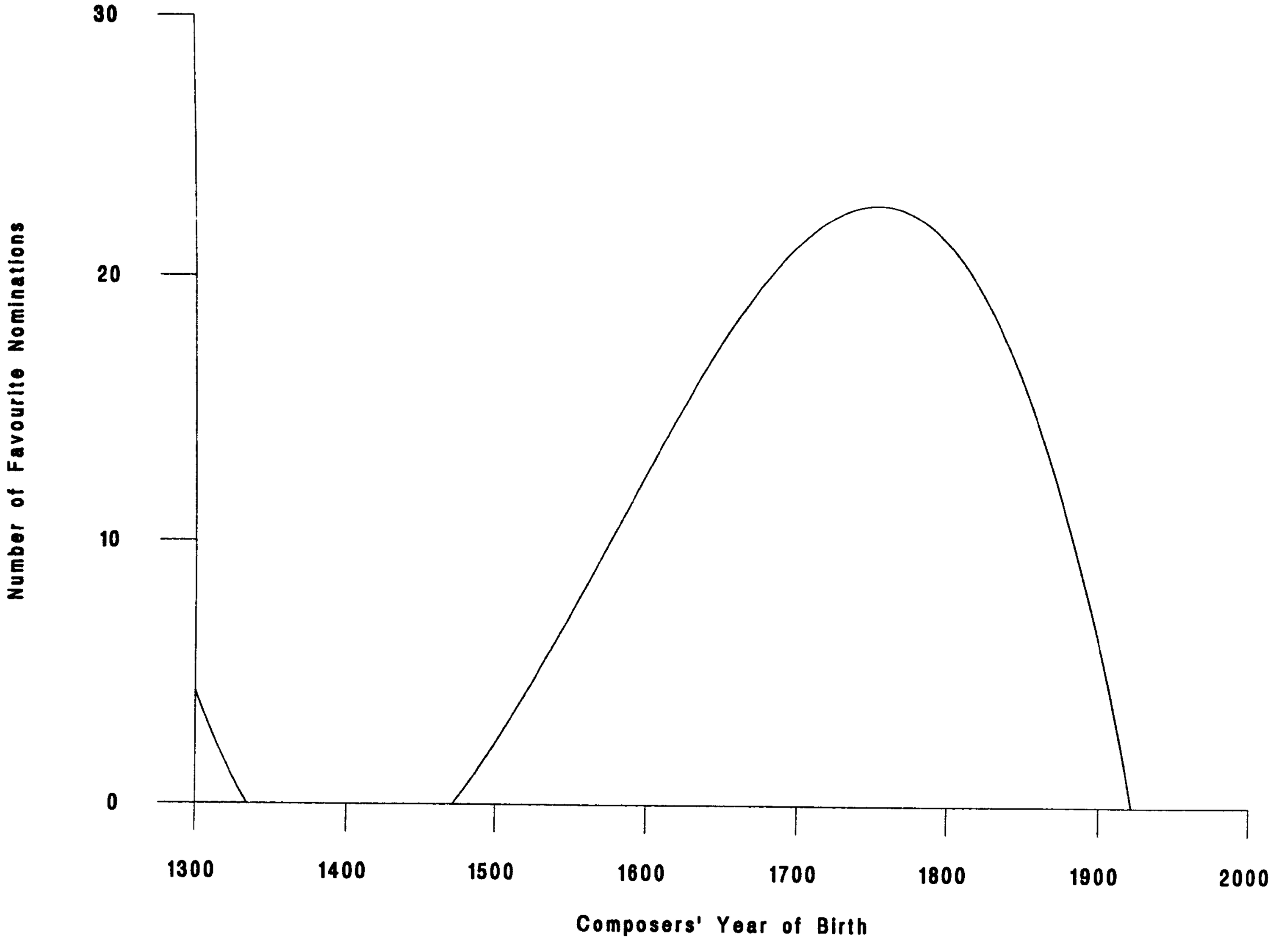


Figure 20.3 - The Relationship Between Classical Music Composers' Year of Birth and the Number of 'Greatest' Nominations

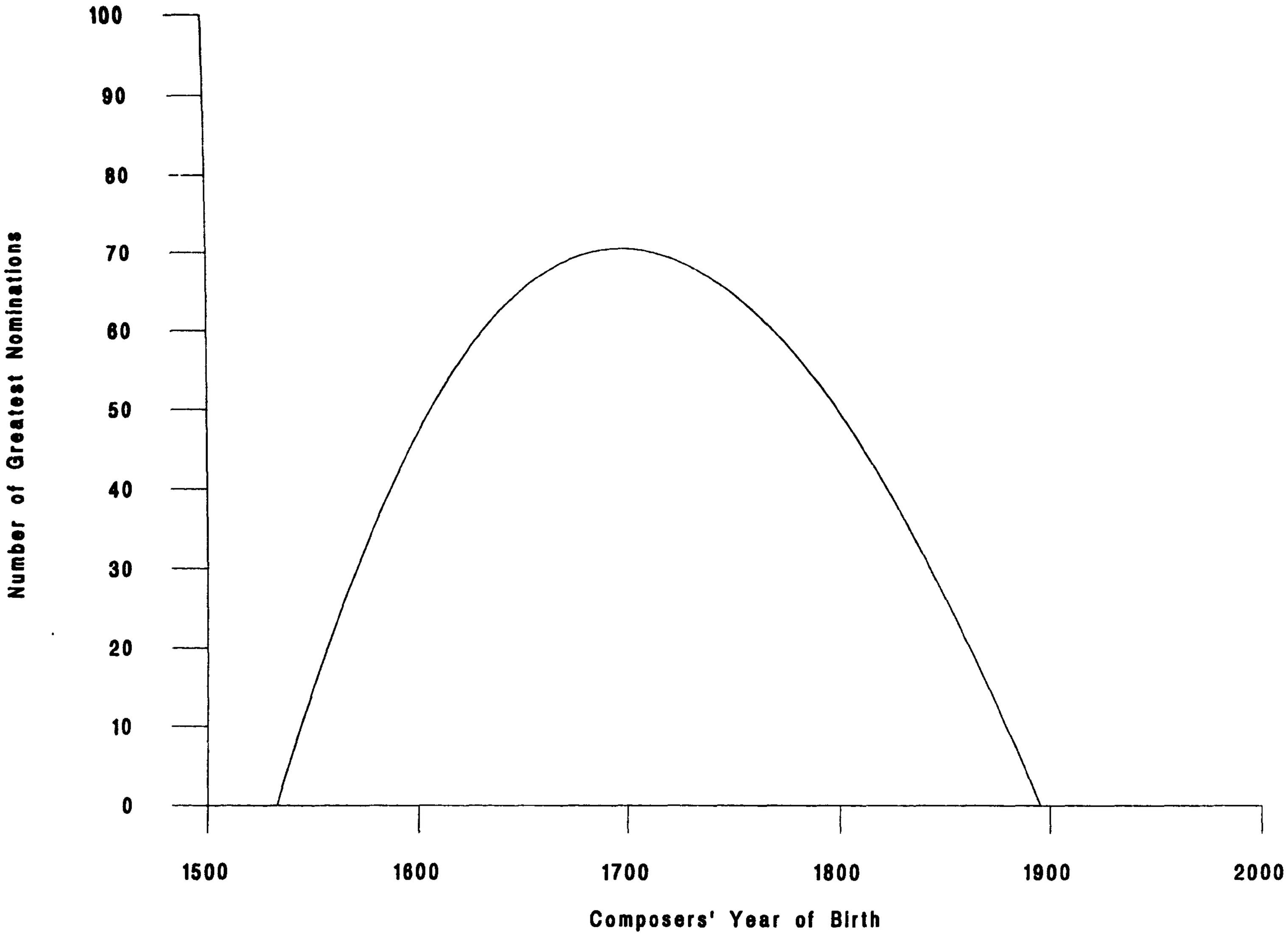


Figure 20.4 - The Relationship Between Pop Performers' Year of Birth and the Number of 'Favourite' Nominations

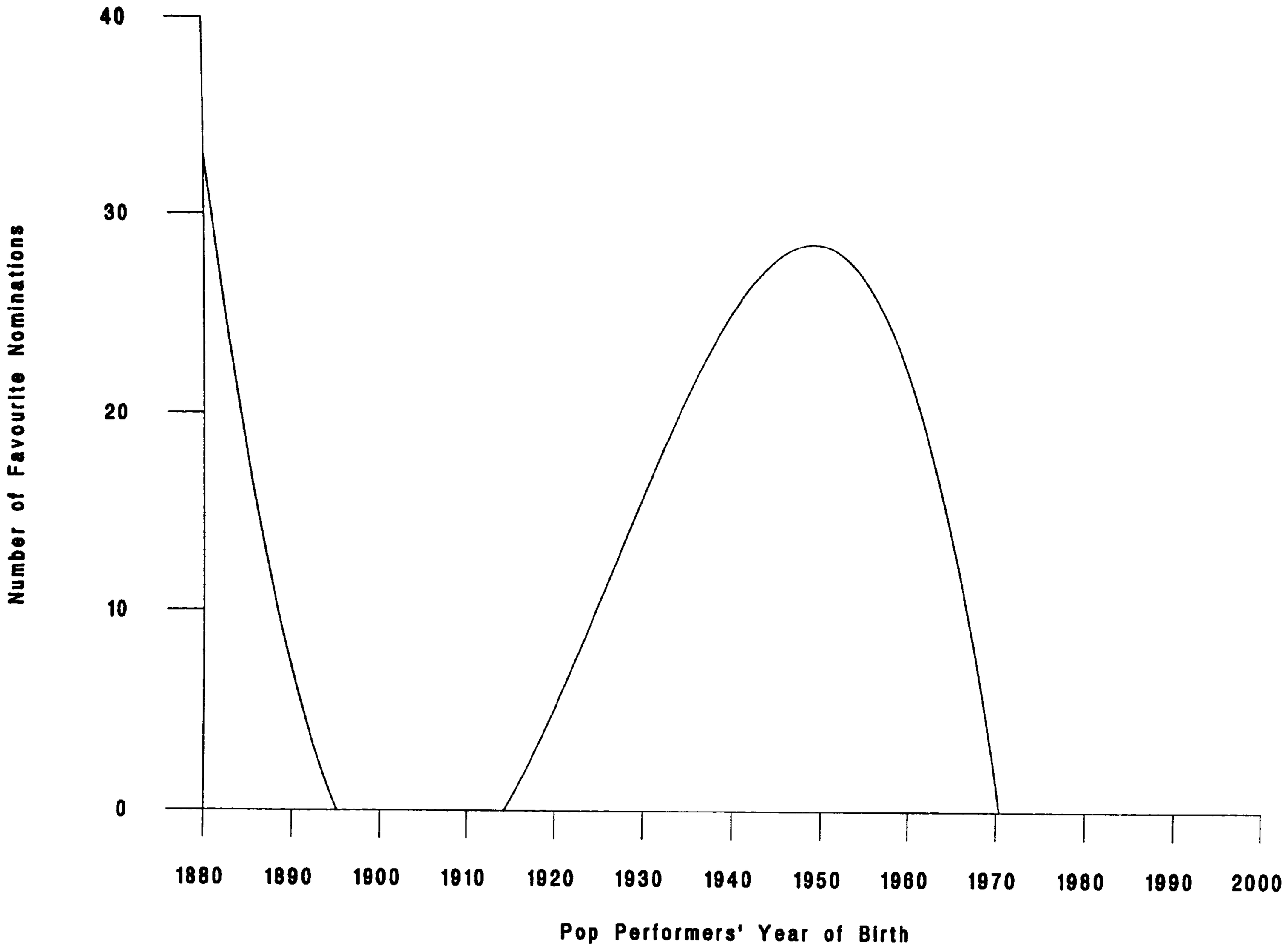


Figure 20.5 - The Relationship Between Pop Performers' Year of Birth and the Number of 'Greatest' Nominations

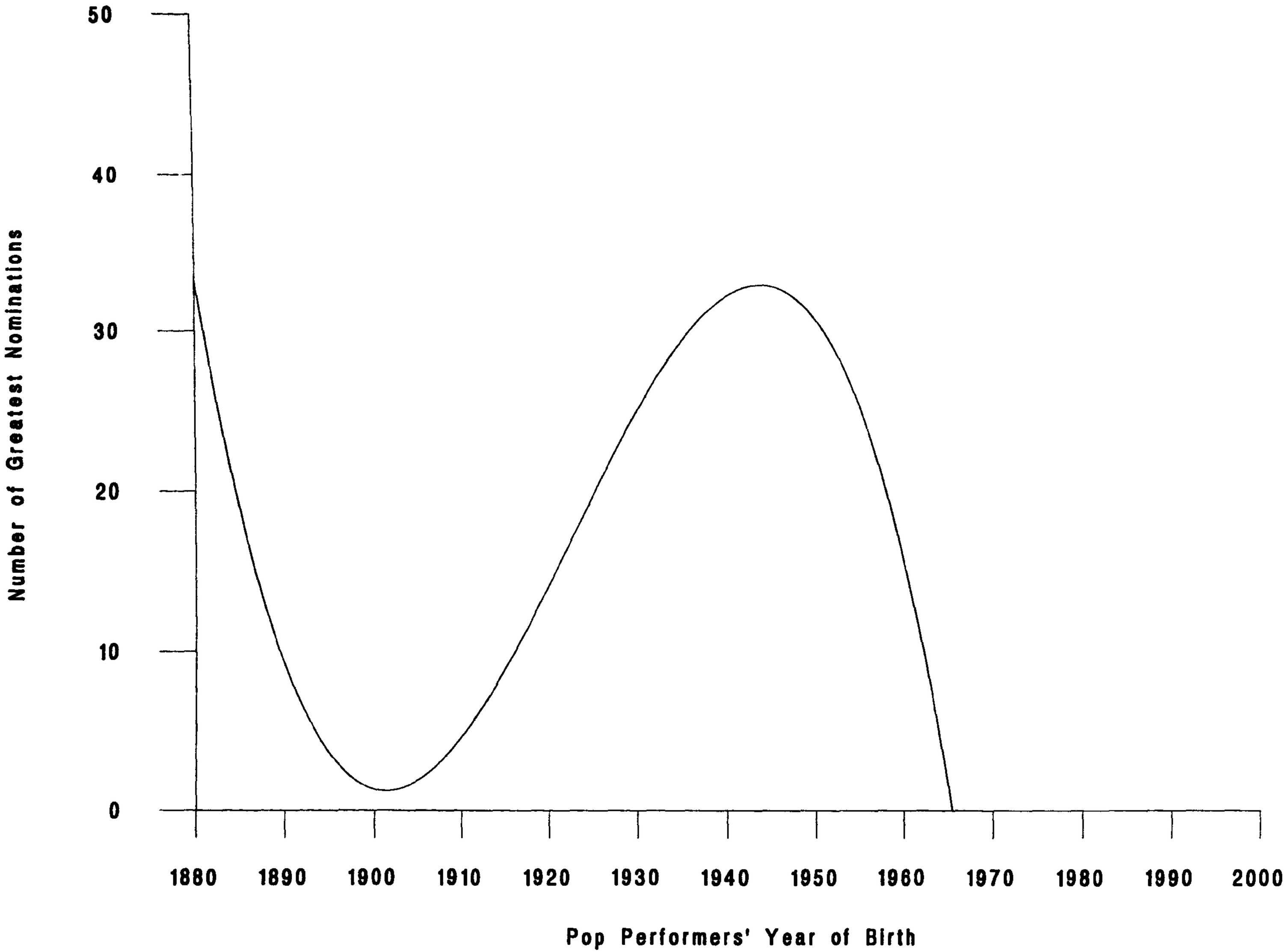


Figure 20.6 - The Relationship Between Novel Authors' Year of Birth and the Number of 'Favourite' Nominations

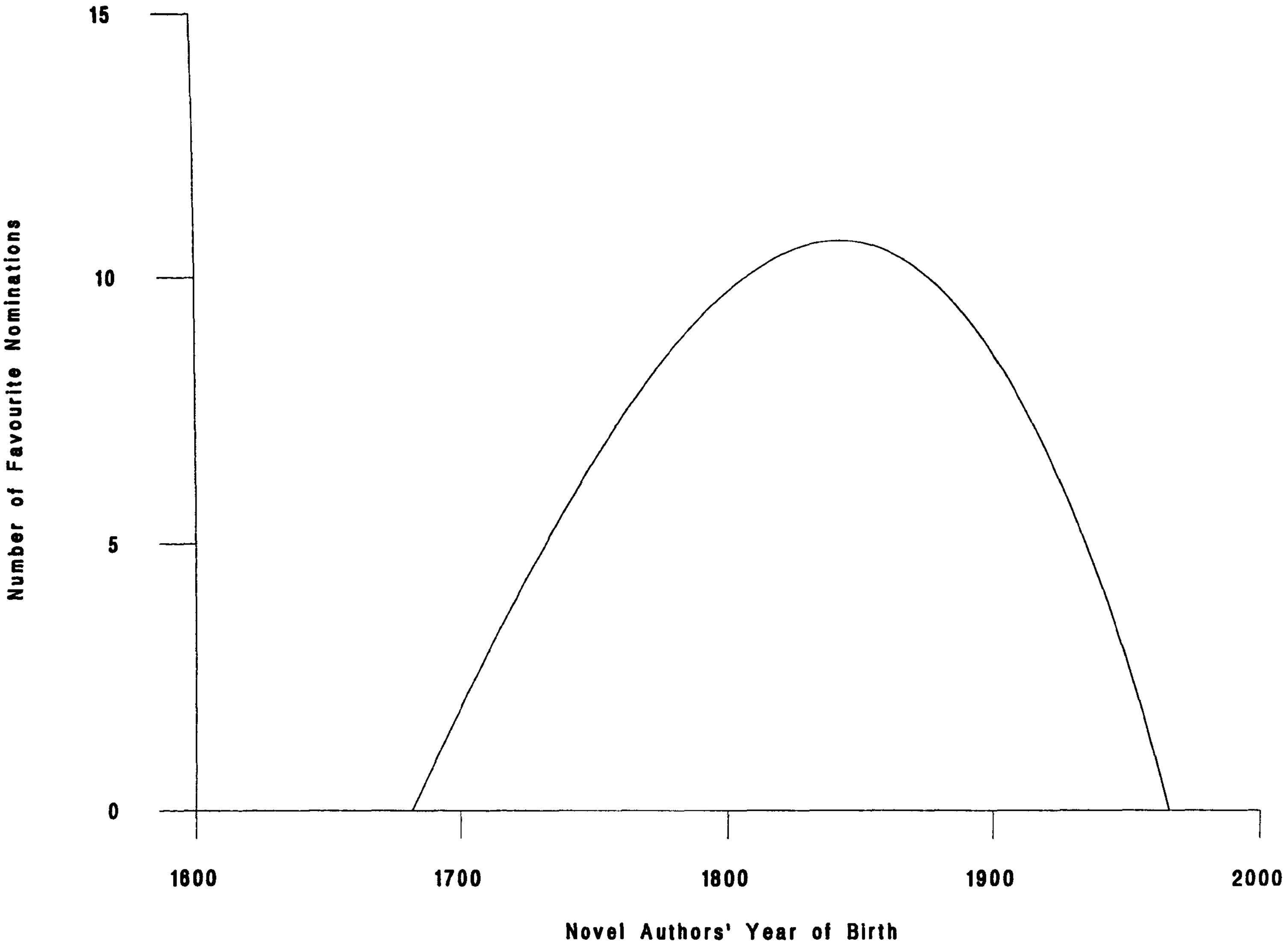
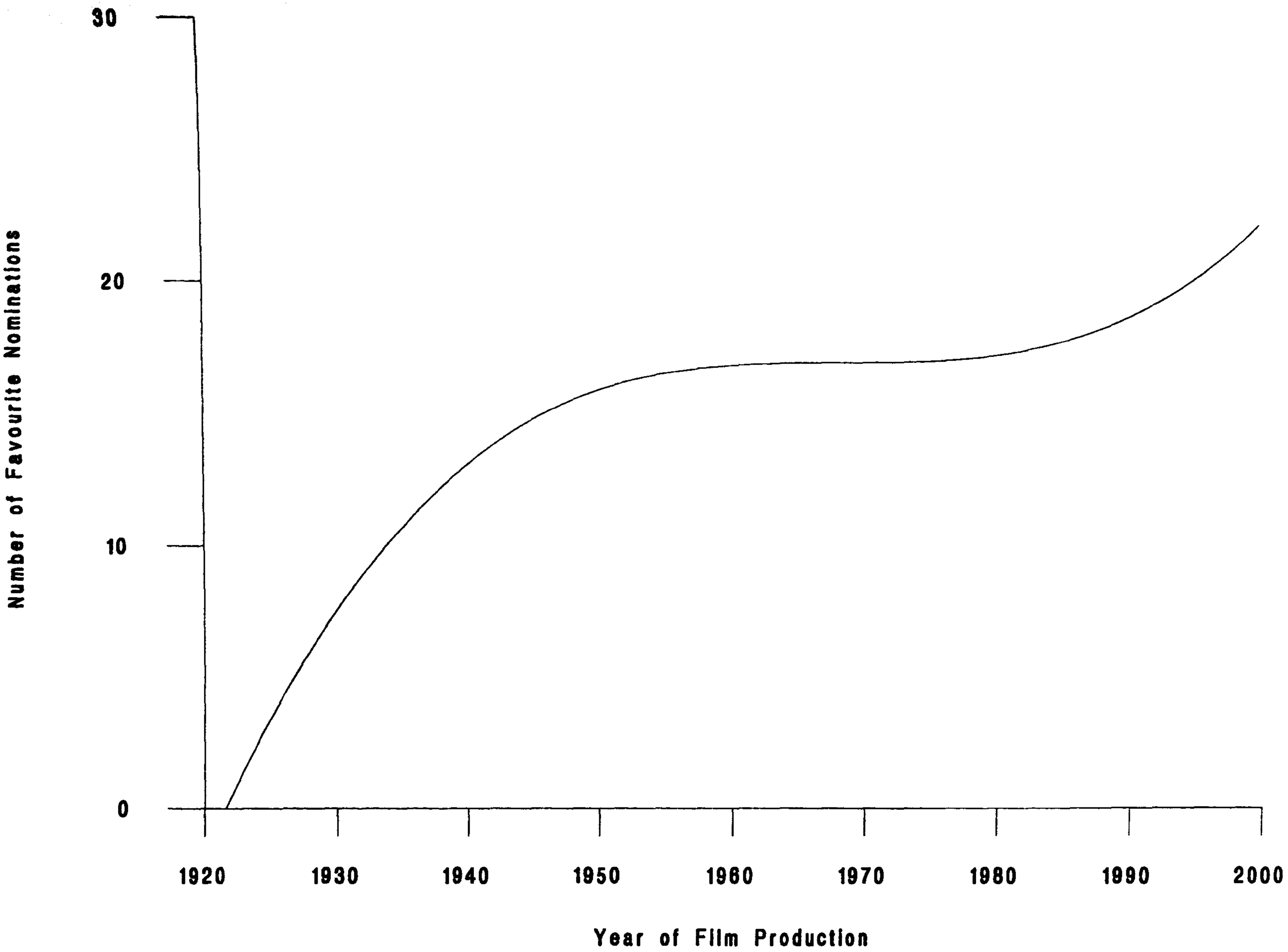


Figure 20.7 - The Relationship Between Films' Year of Production and the Number of 'Favourite' Nominations



The ANOVAs were carried out separately within each of the six art forms, and Table 20.5 shows the results for each country that had works nominated. This table indicates that there were significant differences between the countries for all the categories but film. Put simply, different countries seem to make their most notable contribution to the arts at different points in their history, and this indicates that geographical factors may be involved in aesthetic responses.

Given the absence of a theory which would predict such results, it might be prudent to attribute these rather bizarre findings to chance. However, the pattern of means within each art form is also of interest, suggesting a speculative explanation as to how geographical factors may mediate aesthetic responses. This concerns the economic and political prosperity of the countries relative to others at the same time, with relatively prosperous countries producing important artworks. For example, the only Greek works to be nominated were plays produced in ancient times. Similarly, the Italian works nominated tended to be those produced at around the time that the city states dominated the Mediterranean; the French works nominated tended to be those produced around the Napoleonic era; the British works nominated tended to be those produced at around the time that the country had a world-wide empire; and the works from the U.S.A. tended to be those produced in the 20th century. Whilst this may be purely coincidental, it is worth noting that more prosperous countries might be better able to patronise artists, giving them greater opportunities to produce important works: also, the involvement with other nations that is characteristic of economic and political prosperity should lead to a greater international awareness of that country's cultural products.

Summary and Conclusions

The results of this study lead to four conclusions. First, there is a high degree of consensus on both the 'favourite' and 'greatest' exemplars of an art form, which indicates that people agree on what constitutes 'good taste'. However, there is more consensus in judgements of greatness than of preference, indicating that criteria for the former are more widely agreed upon. Also, consensus on the favourite and greatest exemplars of an art form is largely attributable to a small elite group of works and performers.

Second, people do express liking for what they consider to be great art, although the criteria for greatness may be harder to satisfy than those for simply liking an artwork or performer. Furthermore, everyday art forms tend to be perceived as being more

	Country	Art Form					
		Paintings	Classical Music Pieces	Pop Music Performers	Novels	Plays	Films
Mean Year	Australia			1959.00	1924.50		
	Austria		1790.67				
	Belgium	1500.18					
	Canada			1948.60	1924.25		
	Czechoslovakia		1836.14				
	Finland		1865.02				
	France	1821.37	1840.51	1926.17	1817.79	1776.24	
	Germany	1722.05	1766.11		1841.71	1850.33	
	Greece					512.91 BC	
	Holland	1714.33					
	Italy	1506.01	1741.38				
	Ireland			1952.88	1866.81	1858.11	
	Nigeria				1944.50		
	Norway		1845.60			1828.00	
	Poland		1825.38				
	Russia/U.S.S.R.		1864.03		1863.15	1852.71	
	Spain	1778.12					
	United Kingdom	1811.67	1832.06	1951.16	1873.56	1812.88	1966.37
	U.S.A.	1879.44	1902.13	1940.78	1906.04	1915.90	1964.66
	Other	1822.88	1792.00	1941.73	1865.40	1855.82	1963.53
	F	87.10	13.91	8.60	6.81	399.88	0.57
	d.f.	8, 459	11, 373	6, 280	9, 394	8, 211	2, 524
	p	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.57

N.B. Empty cells indicate those countries that did not have any works/performers nominated

Table 20.5 - Differences between the countries in the birth year (or year of film production) of the creators of nominated artworks

important than they are actually liked, whereas seemingly less commonplace art forms tend to be liked more than they are perceived as being important. Third, certain historical periods are more likely than others to give rise to notable artworks. Finally, the capacity of different countries to produce notable artworks varies over time, and this may perhaps be related to the relative economic and political prosperity of the countries: whilst the author is reluctant to advocate this explanation too strongly, it seems to make some intuitive sense and deserve to be considered by future research. Indeed, the results indicate more generally that archival sources can provide interesting data on aesthetic responses, and this approach is continued in the following chapter.

Chapter 21. Eminence in Pop Music

Chapter 20 demonstrated that there is general agreement on eminence in the arts, and that archival measures may provide interesting and useful data relevant to this. The present chapter extends this by applying Farnsworth's typical approach to a more detailed investigation of eminence in pop music. In addition to employing data obtained through the polling of subjects, the study also considers two archival sources, namely encyclopaedia space allocations, and British and American pop music record sales charts. The aim of the study was to determine the degree of consensus between these different means of measuring eminence in pop music.

A secondary aim of the study was to investigate variations in musical eminence across listeners' lifespan. Holbrook (1995) found that preferences for several types of musical and other stimuli tended to peak for those 'encountered during a *critical period* of development associated with late adolescence or early adulthood' (p. 57), and Holbrook and Schindler (1989) found this specifically for pop music. This means that perceptions of musical eminence might vary between different age groups, with 'eminent' artists being those who were famous whilst subjects were within their critical period. It is also worth noting that this type of explanation corresponds with research described earlier (e.g. Denisoff and Levine, 1972; Fox and Wince, 1975; see Chapter 17) which shows that age is one factor that differentiates between given 'taste publics', and may lead to a breakdown in consensus on musical taste.

The present study investigated the eminence of 200 pop music artists who had enjoyed a U.K. number 1 single between 1955 and 1994. Data was collected for these 200 artists concerning ratings of their eminence by subjects from across the lifespan, the amount of encyclopaedia space allocated to them, and measures of their record chart success in the U.K. and the U.S.A. Although it is impossible to make firm predictions about these measures, Farnsworth's studies suggest that they should all be closely related. However, there are also grounds to suspect that these close relationships may break down in certain respects because of factors such as subjects' age and the decade in which the artists achieved popularity.

Method

Subjects 275 subjects participated in the study. These were 82 subjects aged 9-10 years (mean = 9.25 years, s.d. = 0.48, 40 males, 42 females), 42 subjects aged 14-15 years (mean = 14.64, s.d. = 0.48, 21 males, 21 females), 81 subjects aged 18-24 years

(mean = 19.09 years, s.d. = 1.60, 13 males, 68 females), 46 subjects aged 25-49 years (mean = 36.17 years, s.d. = 7.17, 16 males, 30 females), and 24 subjects aged 50+ years (mean = 65.75 years, s.d. = 6.48, maximum = 78 years, 19 males, 5 females). Subjects were recruited from a school, a university, and a further education college in the suburbs of a city in the East Midlands region of the U.K. To provide further information on the sample, all subjects except the 9-10 year olds were asked to complete a self-report of their musical training and experience. These responses were classified as representing low, intermediate, or high levels by a panel of three independent judges who were unaware of which age group the respondents belonged to. Subjects possessing each of these three levels were similarly represented across each of the age groups, i.e. 15, 16, and 11 subjects in the 14-15 year old group; 32, 29, and 20 subjects in the 18-24 year old group; 16, 20, and 10 subjects in the 25-49 year old group; and 8, 10, and 6 subjects in the 50+ year old group respectively. 9-10 year olds were not assessed for musical training and experience since it was felt that none would have had the opportunity to acquire sufficient training/experience to be classified as 'high' on this measure.

Selection of artists 200 pop music artists were randomly selected for the study. Each of these had had a U.K. number 1 single between 1955 and 1994, and was derived from Gambacinni, Rice, and Rice (1993), and (for post-1992 artists) weekly singles charts published in the British music newspaper *New Musical Express*. The period 1955-1994 was divided into four decades, and artists were selected so that an equal number had had their first U.K. number 1 single in each of the decades.

Dependent variables

i) Eminence selections. Subjects were given a list of the 200 artists, and were told that they would be selecting artists from this list who they considered to be eminent. Eminent artists were defined as 'those who *in your own personal opinion* have performed music that most deserves to be called to the attention of others': this definition was based on that employed in Farnsworth's studies. Subjects were asked to spend 10 minutes reading carefully through the list before selecting up to 30 artists from it, and it was stressed that they could select fewer than this if they believed that an insufficient number of the artists qualified as 'eminent'. Subjects in the 9-10 years age group were given a simplified form of this task, being told 'Here is a list of 200 pop groups and pop singers. Which of these 200 pop groups and singers deserve to be famous ? I would like you to pick up to 30 of them. You can do this by drawing a circle around up to 30 of the names below. Don't forget though, you should only draw

a circle around a name if you think they deserve to be famous. You don't have to pick as many as 30 if you don't want to.' The task was completed by groups of between 10 and 20 subjects, situated in quiet rooms within the educational establishment from which they were recruited.

ii) Archival measures. A series of measures were taken for the period 1955-1994 concerning each of the 200 artists' single and album chart success in the U.K. and U.S.A. These measures were derived from Gambacinni, Rice, and Rice (1993; 1994), and Whitburn (1992; 1995), and were brought up to date using the weekly charts published in *New Musical Express*. The first set of measures concerned the frequency with which the artists enjoyed chart success, and were the number of U.K. number 1 singles (hereafter UK1S); the number of U.S.A. number 1 singles (hereafter US1S); the number of U.K. number 1 albums (hereafter UK1A); the number of U.S.A. number 1 albums (hereafter US1A); the number of U.K. top 10 singles (hereafter UKT10S); the number of U.S.A. top 10 singles (hereafter UST10S); the number of U.K. top 10 albums (hereafter UKT10A); and the number of U.S.A. top 10 albums (hereafter UST10A). Records which reached number 1 were not also considered as top 10 records, although records which re-entered the chart were included in the 8 measures above and treated as new releases. It should also be noted here that in all the measures in this study, the terms 'record', 'single', and 'album' are used to denote releases on any format, rather than simply vinyl.

A second set of measures for each artist derived from the sales charts comprised the number of weeks between the first U.K. top 10 single entering the chart and the last U.K. top 10 single leaving the chart (hereafter FLUKT10S); the number of weeks between the first U.S.A. top 10 single entering the chart and the last U.S.A. top 10 single leaving the chart (hereafter FLUST10S); the number of weeks between the first U.K. top 10 album entering the chart and the last U.K. top 10 album leaving the chart (hereafter FLUKT10A); and the number of weeks between the first U.S.A. top 10 album entering the chart and the last U.S.A. top 10 album leaving the chart (hereafter FLUST10A). These four variables are a measure of the chart durability of the 200 artists, and for this reason, records which re-entered the chart were included in the measures.

Record sales chart data was also used to derive a third set of variables, which provide a coarse measure of the impact that each artist had on the singles and albums charts. These 'impact variables' were calculated as the number of top 10 singles or albums multiplied by the number of weeks that these had spent on the relevant charts. The

measures were calculated separately for each artists' performance in the U.K. and U.S.A. singles and albums charts. The impact of an artist on the U.K. singles chart (hereafter UKSIMPACT) was calculated as UKT10S multiplied by FLUKT10S. The impact of an artist on the U.K. albums chart (hereafter UKAIMPACT) was calculated as UKT10A multiplied by FLUKT10A. The impact of an artist on the U.S.A. singles chart (hereafter USSIMPACT) was calculated as UST10S multiplied by FLUST10S. The impact of an artist on the U.S.A. albums chart (hereafter USAIMPACT) was calculated as UST10A multiplied by FLUST10A. A final measure derived for each artist from the record sales charts was the number of years elapsed since their first U.K. number 1 single (hereafter YFIRST1). It is worth noting that, since they are based on record buying, these variables derived from record sales charts may be seen as behavioural measures of the popularity of each of the artists, and enjoy a considerable degree of ecological validity.

Two further archival measures were derived for each artist from the Laserlog Catalogue (1994), namely the total number of singles released in the U.K. (hereafter TOTALSIN), and the total number of albums currently available in the U.K. (hereafter TOTALALB). The first of these variables was intended as a measure of each artist's productivity, and so re-issued singles were not counted. The latter variable may be seen as a measure of the extent to which the record industry believes that each artist's work should be popular, since unpopular artists will have their works deleted.

A final series of archival measures was derived from three music encyclopaedias, namely *The Oxford Companion to Popular Music* (Gammond, 1991), *The Guinness Encyclopaedia of Popular Music* (Larkin, 1992), and *The Penguin Encyclopaedia of Popular Music* (Clarke, 1989). The compilers of these are subject to limitations on the amount of available space, and so differences in the amount of space allocated to different artists should indicate encyclopaedia compilers' opinion of the differential importance of those artists (see Farnsworth (1950) for a fuller discussion of this method). The amount of space allocated to each of the 200 artists in each of the encyclopaedias was measured in terms of column centimetres, and the variables were termed OXFORD, GUINNESS, and PENGUIN respectively. The mean of OXFORD, GUINNESS, and PENGUIN was also calculated for each artist, and this measure was termed MEANENCY. The measures taken from the Oxford encyclopaedia did not include the list of suggested further reading on each artist, and measures taken from the Guinness encyclopaedia did not include the discography for each artist. Measures were not taken for those artists who had not had their first U.K. number 1 single at the

time when the given encyclopaedia was published, and these data were excluded from the analyses.

Results and Discussion

Relationships between subjects' eminence selections A split-half reliability analysis was carried out to determine the degree of internal consistency in responses to the different artists. The 200 artists were randomly allocated to one of two sub-groups so that 25 of the 50 artists from each decade appeared within each sub-group. A product-moment correlation was carried out on the mean frequency with which the artists were selected as eminent such that, when entering data into the analysis, responses to each artist were paired in the other sub-group with responses to another artist from the same decade. The resulting coefficient was +0.37 ($N = 100$, $p < 0.001$) which indicates that subjects' responses were consistent and apparently consensual.

The magnitude of this correlation is rather low as compared to those typically obtained by Farnsworth, and this is probably attributable to the different means by which the split-half reliability coefficient was calculated. In the above analysis, artists who achieved their popularity during the same decade were arbitrarily paired with one another across the two sub-groups: it is perhaps worth noting that there is no *a priori* reason to assume that one artist from a particular decade should be perceived as eminent simply because another one was, and this seems to be reflected in the rather low coefficient which obtained above. When attempting to determine the degree of consensus in eminence judgements it may be more informative to follow Farnsworth's technique which compares the responses of different sub-groups of people to the *same* artists: such a technique does not require the arbitrary pairing of artists in calculating the correlation coefficient, and a further split-half reliability analysis was carried out in light of this.

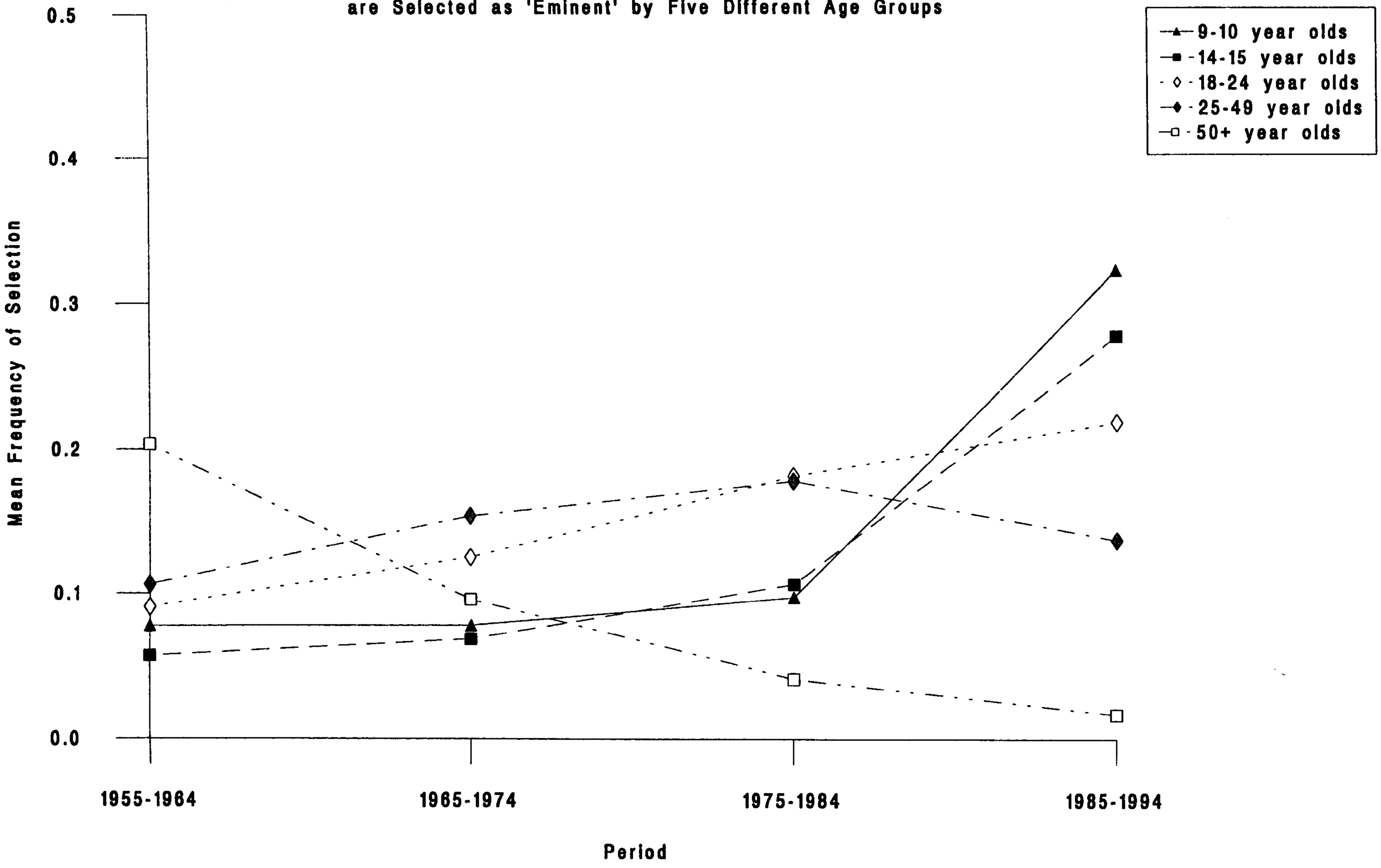
Subjects were alternately allocated to one of two subgroups, and the mean frequency with which each artist was selected as eminent was calculated within each subgroup. The product-moment correlation was calculated between these two sets of ratings, and gave rise to a much higher coefficient of +0.96 ($N = 200$, $p < 0.001$) which indicates a considerable degree of consensus between subjects. This was further tested by repeating the analysis with the two sub-groups composed instead of males and females respectively. This gave rise to a coefficient of +0.90 ($N = 200$, $p < 0.001$), which indicates a considerable degree of consensus between males' and females' eminence selections.

To further test Farnsworth's claim that there is agreement on musical eminence, a 5 x 4 mixed ANOVA was calculated to determine whether the mean frequency with which each artist was selected by subjects' was the product of an interaction between two independent variables, namely the subjects' age group and the decade in which the artists had their first U.K. number 1 single. Both these independent variables gave rise to significant main effects ($F = 5.93$, d.f. = 4, 215, $p < 0.001$, and $F = 15.75$, d.f. = 3, 645, $p < 0.001$ respectively). There was also a significant interaction between these two variables ($F = 11.27$, d.f. = 12, 645, $p < 0.001$), and the resulting means are illustrated in Figure 21.1.

Figure 21.1 indicates clear disagreement between the age groups in terms of their eminence selections, and also that there is strong support for Holbrook's (1995) claim that aesthetic responses become crystallised in a so-called *critical period* during adolescence and early adulthood. 9-10 year olds and 14-15 year olds showed a marked tendency to select artists who had had their first U.K. number 1 single between 1985 and 1994. 18-24 year olds showed this same tendency although they were also more likely than younger age groups to select artists who had their first U.K. number 1 single in earlier decades. In each of these three age groups, the tendency to select artists from other decades increased with the recency of those decades to the period 1985-1994. 25-49 year olds tended to select artists from between 1975 and 1984, and again the tendency to select artists who had their first U.K. number 1 single in other decades increased with the proximity of those decades to the period 1975-1984. Similarly, 50+ year old subjects showed a tendency to select artists from the period 1955-1964, and the tendency to select artists who had their first U.K. number 1 single in other decades increased with the proximity of those decades to the period 1955-1964. This pattern indicates a tendency to select as eminent those artists who had their first U.K. number 1 single when the subjects were themselves young.

The clarity of these differences between the age groups is illustrated further by Table 21.1, which shows the product-moment correlations between the different age groups in the mean frequency with which they selected each of the 200 artists as being eminent. The magnitude of these correlations increases directly in line with the proximity of the age groups: the highest correlations are between subjects from adjoining age groups, and the coefficients decrease progressively as the difference between subjects' ages increases. In Table 21.1, 'Overall eminence' represents the frequency with which each of the 200 artists was selected by subjects irrespective of their age group, and is a global measure of subjects' eminence selections. 50+ year

Figure 21.1 - Mean Frequency With Which Pop Music Artists from Different Periods are Selected as 'Eminent' by Five Different Age Groups



	9-10 year olds	14-15 year olds	18-24 year olds	25-49 year olds	50+ year olds	Overall eminence
9-10 year olds		+0.81**	+0.39**	+0.25**	-0.01	+0.78**
14-15 year olds			+0.67**	+0.49**	0.00	+0.89**
18-24 year olds				+0.83**	+0.14	+0.85**
25-49 year olds					+0.26**	+0.73**
50+ year olds						+0.19*

*p < 0.01, **p < 0.001, N = 200. All other values were non-significant.

Table 21.1 - Product-moment correlations between the eminence selections of 5 different age groups

olds' selections corresponded much less with 'overall eminence' than did other age groups', and only correlated significantly with 25-49 year old subjects' selections. This suggests that the 50+ year olds were particularly unlikely to agree with other subjects.

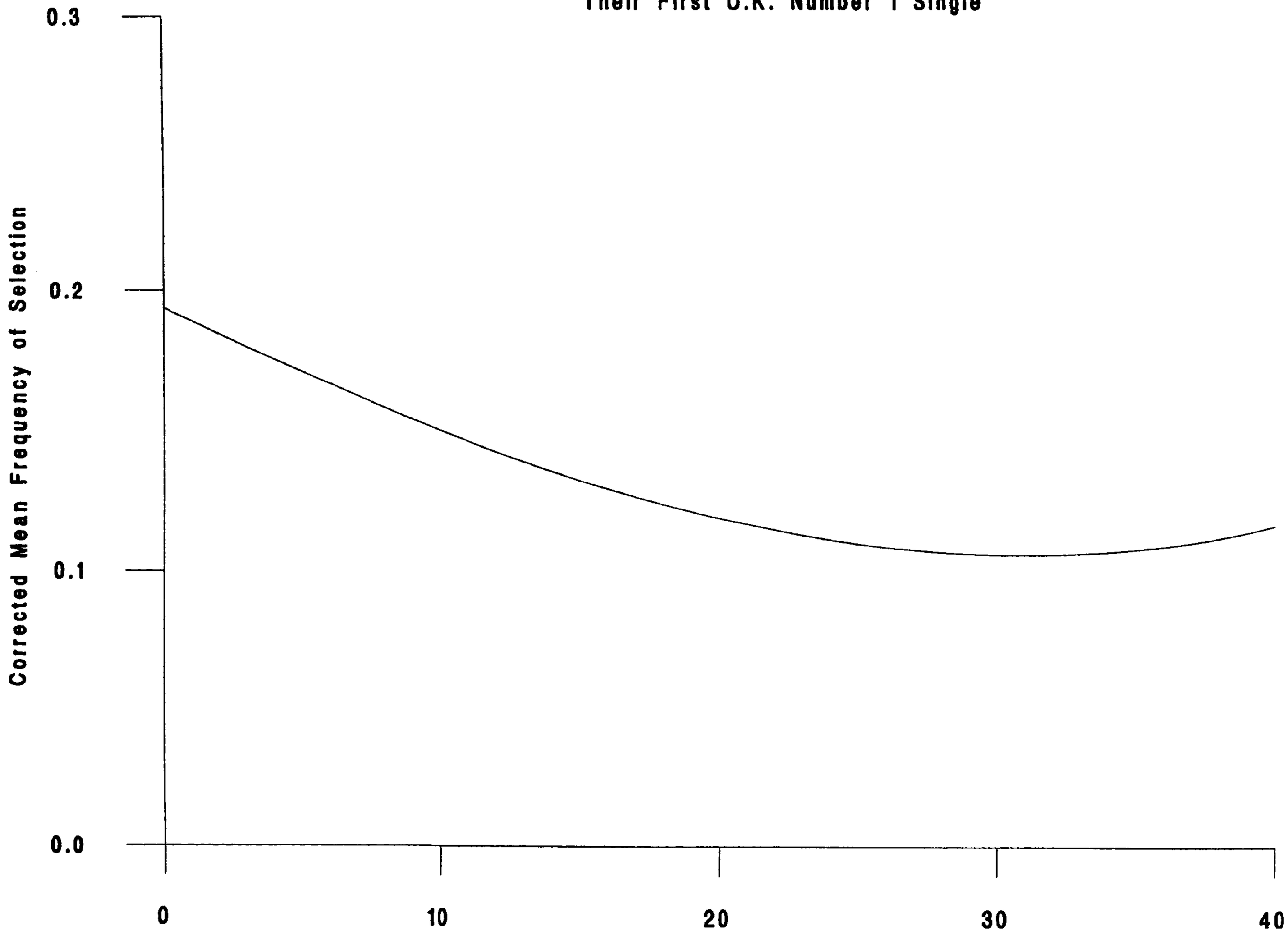
Relationships between subjects' eminence selections and archival measures

Curvilinear regression analyses were carried out to investigate the relationship between subjects' eminence selections and the number of years since the 200 artists each had their first U.K. number 1 single (YFIRST1). Since there was a tendency for particular age groups to select artists who had their first U.K. number 1 single in a particular decade, it is inappropriate to use subjects' raw eminence selections in the present analysis: the sample comprised disproportionate numbers from the different age groups, and the use of simple frequencies with which artists were selected would therefore skew the data toward the decade favoured by the best represented age group. To overcome this, a mean frequency of selection was derived for each artist that was weighted for the unequal sample sizes in different age groups. Firstly, the mean frequency of selection for each artist was calculated within each age group. For each artist, these mean frequencies were then summed across the age groups. The value for each artist was then divided by the number of age groups. The resulting values are referred to hereafter as 'weighted eminence selections'.

The degree of fit of linear, quadratic, and cubic functions to the relationship between the weighted eminence selections and YFIRST1 was then calculated. The linear and quadratic models were fitted significantly. The latter explained the greatest amount of variance in the data, and although this value was small ($R^2 = 0.05$), it was highly significant ($F = 5.33$, d.f. = 197, $p < 0.01$). The quadratic relationship between these two variables is plotted in Figure 21.2, which indicates generally that the eminence of pop music artists decreases as the time since their first U.K. number 1 single increases: older artists seem to be neglected, giving rise to a 'reverence for the recent' effect. However, there is a slight up-turn in eminence for those artists who had their first U.K. number 1 single between 1955 and 1960: perhaps the artists from this period are perceived as 'trail-blazers' or the innovators of pop music. This supports Farnsworth's (1950) argument that '*Taste is not mere reverence for the past*' (p. 60).

Product-moment correlations were then calculated to test the extent to which subjects' weighted eminence selections corresponded with the amount of space allocated to the 200 artists in the three music encyclopaedias. The correlations between weighted eminence selections and each of GUINNESS, OXFORD, and PENGUIN were +0.55 (N = 194), +0.40 (N = 194), and +0.46 (N = 191) respectively ($p < 0.001$ in all cases).

Figure 21.2 - The Relationship Between Pop Music Artists' Eminence and Number of Years Since Their First U.K. Number 1 Single



The magnitude of these correlations is perhaps surprisingly low, and is considerably lower than those reported by Farnsworth (1950) for composers of classical music. It should be noted that the encyclopaedias employed were the most recent available, although the time lag between their publication and the collection of subjects' eminence selections (2-6 years) may have lowered the coefficients to some extent. Nevertheless the present values indicate that there was only a moderate degree of consensus between subjects and the encyclopaedia compilers regarding the relative importance of the artists. These findings are particularly interesting given that the encyclopaedia variables could perhaps be taken as measures of expert opinion.

To investigate this degree of consensus further, product-moment correlations were carried out between each of GUINNESS, OXFORD, and PENGUIN, and the separate eminence selections of the 5 age groups. The results of these are presented in Table 21.2, which indicates three patterns which apply to all the encyclopaedias. The correlations peak for the 25-49 year old group, such that they show broadly an inverted-U pattern with increasing age; they are low for subjects aged under 15 years, and non-significant for 9-10 year olds; and are all significant for subjects over 14 years. In conjunction, these results suggest that the encyclopaedias do not strongly reflect the opinions of under 18s: they do however reflect the opinions of adults, but only to a fairly substantial degree for 25-49 year olds (and this is perhaps because 25-49 year olds form the primary market for pop music encyclopaedias).

Product-moment correlations were calculated between subjects' weighted eminence selections and both the total number of singles that each of the 200 artists had released, and the total number of albums by each artist that were currently available. The correlation between weighted eminence selections and TOTALSIN was +0.41 ($N = 200$, $p < 0.001$). Although only moderate, this highly significant value indicates that artists were more likely to be selected as eminent if they had released a large number of singles. This could be because the probability of rated eminence increases with productivity (see Dennis, 1966; Simonton, 1980), or more simply because unworthy artists have their recording contracts terminated and do not have the opportunity to release a large number of singles (i.e. a cultural-feedback process). The correlation between subjects' weighted eminence selections and TOTALALB was +0.46 ($N = 200$, $p < 0.001$). This indicates that the artists' eminence increased with the number of albums of their work that the record industry had currently available, and this suggests a consensus between the public and the record industry. It should also be noted that both the correlations reported here were of surprisingly low magnitude: both

	OXFORD	GUINNESS	PENGUIN
9-10 year olds	+0.06	+0.12	+0.04
14-15 year olds	+0.18*	+0.29***	+0.19**
18-24 year olds	+0.35***	+0.56***	+0.48***
25-49 year olds	+0.49***	+0.67***	+0.62***
50+ year olds	+0.42***	+0.41***	+0.42***

*p < 0.05, **p < 0.01, ***p < 0.001.
N = 191 for coefficients with PENGUIN, otherwise N = 194

Table 21.2 - Product-moment correlations between the eminence selections of 5 different age groups and encyclopaedia space allocations

TOTALSIN and TOTALALB should reflect the opinions of an industry whose success depends on it concurring with (or moulding) public opinion.

Multiple regression analyses were carried out to investigate the relationships between subjects' weighted eminence selections and the archival variables derived from record sales charts. As noted above, this latter set of variables provide behavioural measures of the popularity of the 200 artists. The first set of analyses investigated the extent to which subjects' weighted eminence selections regressed upon measures of the number of weeks between the 200 artists' first and last top 10 singles and albums entering and leaving the U.K. and U.S.A. charts (i.e. FLUKT10S, FLUKT10A, FLUST10S, FLUST10A). The resulting value of R^2 indicated that these four variables accounted for 41.78% of the variance in subjects' weighted eminence selections, and this was statistically significant ($F = 34.99$, d.f. = 4, 195, $p < 0.001$). However, of the four variables only FLUKT10A and FLUST10A were associated significantly with subjects' weighted eminence selections ($T = 6.42$ and 5.15 respectively, $p < 0.001$ in both cases). This analysis demonstrates that although the simple duration of artists' chart careers are associated with their eminence, this is attributable primarily to the duration of the artists' *album* chart career, so that the duration of their career on the singles chart is not significant. Since FLUST10A was associated significantly with subjects' eminence selections, distinctions between length of chart career in the U.K. and the U.S.A. seem to be less important in explaining eminence than are distinctions in the length of artists' singles as distinct from albums chart careers.

Multiple regression analysis was also carried out to determine the extent to which subjects' weighted eminence selections regressed upon the number of top 10 and number 1 singles and albums that the 200 artists had had in the U.K. and the U.S.A. (i.e. UK1S, UK1A, US1S, US1A, UKT10S, UKT10A, UST10S, UST10A). The resulting values of R^2 indicated that these 8 variables explained 47.42% of the variance in subjects' weighted eminence selections, and this was statistically significant ($F = 21.30$, d.f. = 8, 189, $p < 0.001$). However, of the 8 variables only UK1A was associated significantly with subjects' weighted eminence selections ($T = 6.24$, $p < 0.001$). This analysis indicates that firstly, the number of hit records is associated with an artists' eminence although secondly, this is largely attributable to the number of U.K. number 1 albums so that other types of hit record are not significant. Finally, the values of R^2 resulting from this and the former multiple regression analysis suggest that the number of hit records is associated slightly more closely with an artists' eminence than is the number of weeks that these records spent on the sales charts.

A final set of multiple regression analyses investigated the extent to which subjects' eminence selections regressed upon measures of the impact that the 200 artists had had on the U.K. and U.S.A. singles and albums charts (i.e. UKSIMPACT, UKAIMPACT, USSIMPACT, USAIMPACT). The resulting value of R^2 indicated that the four impact variables explained 29.14% of the variance in subjects' eminence selections ($F = 19.84$, d.f. = 4, 193, $p < 0.001$). However, only the measures of album chart impact (UKAIMPACT and USAIMPACT) were associated significantly with subjects' eminence selections ($T = 3.68$, $p < 0.001$; and $T = 2.74$, $p < 0.01$ respectively). These values indicate again the relative importance of success in the albums rather than the singles charts. More importantly however, the four variables explained less of the variance in subjects' eminence selections than isolated measures of either the number of weeks between the artists' first and last top 10 records, or the artists' number of hit records. This is extremely surprising since the impact variables comprised information from both of these sources, and might have been expected to explain more of the variance in subjects' eminence selections. Two further multiple regression analyses were carried out to investigate this.

These analyses again considered the regression of subjects' weighted eminence selections upon the impact variables, but did so firstly for those artists who had had their first U.K. number 1 single between 1955 and 1974, and secondly for those artists who had had their first U.K. number 1 single between 1975 and 1994. In the analysis of 1955-1974 artists, the resulting value of R^2 indicated that the impact measures explained 57.68% of the variance in subjects' weighted eminence selections ($F = 33.74$, d.f. = 4, 94, $p < 0.001$). UKAIMPACT and USAIMPACT were associated significantly with subjects' weighted eminence selections ($T = 5.55$, $p < 0.001$; and $T = 2.89$, $p < 0.01$ respectively). The comparable analysis for 1975-1994 artists yielded a value of R^2 which indicated that the impact variables explained only 11.97% of the variance in subjects' weighted eminence selections ($F = 3.02$, d.f. = 4, 94, $p < 0.05$), and only UKSIMPACT was associated significantly with these weighted eminence selections ($T = 2.23$, $p < 0.05$). These two analyses indicate that the association between artists' impact on the record sales charts and their eminence was much stronger for artists who had their first U.K. number 1 single prior to 1975 than for those who had their first U.K. number 1 single after this date: more simply, chart performance is associated less closely with eminence for more recent artists. This is particularly interesting since it indicates that a more recent artist can still become eminent without having had the opportunity to make a great impact on the charts:

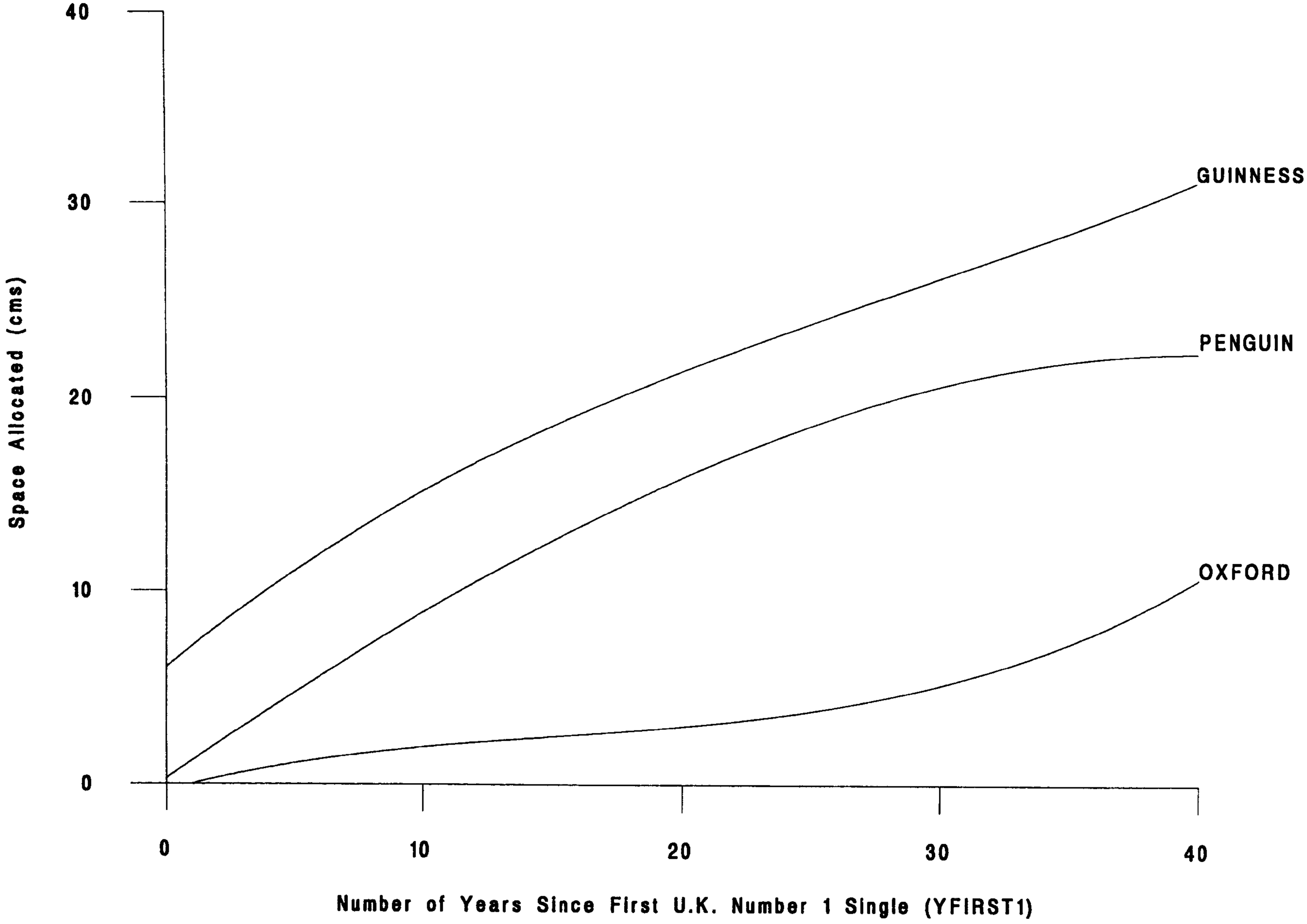
eminence may come about through factors other than a period of protracted popularity.

Relationships between archival measures Curvilinear regression analysis investigated the relative fit of linear, quadratic, and cubic functions to the relationship between encyclopaedia space allocated to the 200 artists (OXFORD, GUINNESS, PENGUIN) and the number of years since these artists' first U.K. number 1 single (YFIRST1). The relationships between YFIRST1 and both OXFORD and GUINNESS were fitted best to a cubic function, whereas the relationship between YFIRST1 and PENGUIN was fitted best to a quadratic function ($R^2 = 0.187$, $F = 15.00$, d.f. = 190, $p < 0.001$; $R^2 = 0.113$, $F = 8.29$, d.f. = 190, $p < 0.001$; and $R^2 = 0.158$, $F = 18.46$, d.f. = 188, $p < 0.001$ respectively). These relationships are illustrated in Figure 21.3.

Although statistically cubic or quadratic in nature, Figure 21.3 indicates that the most salient aspect of the relationships between YFIRST1 and the three encyclopaedia measures was their generally positive nature. That is, whilst acknowledging the existence of more subtle trends, space allocations generally increased with the time that had passed since the artists had had their first U.K. number 1 single, showing a 'reverence for the past' effect. This contrasts with the general trend of 'reverence for the recent' that is evident in the relationship between subjects' weighted eminence selections and YFIRST1 (see Figure 21.2): this discrepancy between Figures 21.2 and 21.3 is a likely explanation for the unexpectedly low magnitude of the correlations between subjects' weighted eminence selections and the three encyclopaedia measures. The data also contrasts with Farnsworth's (1950) claim that '*Taste is not mere reverence for the past*' (p. 60). Indeed, OXFORD shows a particularly strong reverence for the past effect, and it is interesting to note that the Oxford encyclopaedia concerned popular music in general rather than that of solely the Afro-American tradition. This meant that the 200 present artists had to compete for space with a much wider range of musicians, and may explain why only those with very high YFIRST1 values were sufficiently eminent to secure larger space allocations.

The apparent consensus *between* the three encyclopaedias that is suggested by Figure 21.3 was investigated further by calculating the product-moment correlations between OXFORD, GUINNESS, and PENGUIN. The resulting coefficients were +0.75 (N = 194) between OXFORD and GUINNESS; +0.75 (N = 191) between OXFORD and PENGUIN; and +0.86 (N = 191) between GUINNESS and PENGUIN ($p < 0.001$ in all cases). These values confirm that there was a high degree of consensus between the encyclopaedias on the artists' relative importance.

Figure 21.3 - The Relationship Between the Amount of Space Allocated in Three Popular Music Encyclopaedias and Number of Years Since First U.K. Number 1 Single For 200 Pop Music Artists



A series of multiple regression analyses was calculated to determine the extent to which the space allocated to the 200 artists in music encyclopaedias was associated with the variables derived from record sales charts. MEANENCY was used as the measure of space allocations given the high correlations between the three individual encyclopaedia measures. The first set of analyses investigated the extent to which MEANENCY regressed upon measures of the number of weeks between the 200 artists' first and last top 10 singles and albums entering and leaving the U.K. and U.S.A. charts (namely FLUKT10S, FLUKT10A, FLUST10S, FLUST10A). The resulting value of R^2 indicated that these four variables accounted for 58.04% of the variance in MEANENCY ($F = 67.44$, d.f. = 4, 189, $p < 0.001$). FLUKT10S, FLUKT10A, and FLUST10A were all associated significantly with MEANENCY ($T = 2.19$, $p < 0.05$; $T = 4.49$, $p < 0.001$; and $T = 7.98$, $p < 0.001$ respectively). This indicates that although the simple durations of artists' chart careers are related to their space allocation in music encyclopaedias, the durations of their singles chart careers in the U.S.A. are not significant.

A second multiple regression analysis investigated the extent to which MEANENCY regressed upon the number of top 10 and number 1 singles and albums that the 200 artists had had in the U.K. and the U.S.A. (as measured by UK1S, UK1A, US1S, US1A, UKT10S, UKT10A, UST10S, UST10A). The resulting value of R^2 indicated that these 8 variables accounted for 72.60% of the variance in MEANENCY ($F = 62.60$, d.f. = 8, 183, $p < 0.001$). However, of the 8 variables only UK1S, UK1A, and UST10A were associated significantly with MEANENCY ($T = 4.26$, $p < 0.001$; $T = 2.63$, $p < 0.01$; and $T = 9.02$, $p < 0.001$). This analysis indicates that firstly, the number of hit records is associated with an artist's encyclopaedia space allocation, although secondly, this is largely attributable to the number of U.K. number 1 singles and albums, and to the number of U.S.A. top 10 albums: other types of hit record were not significant. The values of R^2 resulting from this and the previous analysis indicate that the number of hit records is associated more closely with artists' encyclopaedia space allocations than is the number of weeks that these records spent on the sales charts. This corresponds with the regression analyses above concerning the relationship between record sales chart variables and subjects' weighted eminence selections.

A final set of multiple regression analyses investigated the extent to which MEANENCY regressed upon measures of the impact that the 200 artists had had on the U.K. and U.S.A. singles and albums charts (namely UKSIMPACT, UKAIMPACT, USSIMPACT, USAIMPACT). The resulting value of R^2 indicated

that the four impact variables explained 65.71% of the variance in MEANENCY ($F = 92.46$, d.f. = 4, 187, $p < 0.001$). This indicates that encyclopaedia space allocations were associated with the 200 artists' impact on the charts, although again only the measures of impact on the albums (UKAIMPACT AND USAIMPACT) rather than the singles charts were associated significantly with MEANENCY ($T = 4.10$, $p < 0.001$; and $T = 8.22$, $p < 0.001$ respectively).

In conjunction, these three multiple regression analyses suggest that success in the albums rather than the singles charts is associated more closely with encyclopaedia space allocations. The results also indicate that the four impact variables explained less of the variance in MEANENCY than the measures of the number of hit records. It should be noted that this pattern remained when in further analyses pre- and post-1975 artists were considered separately. This suggests that the simple *frequency* of chart success was more closely related to encyclopaedia space allocations than was the duration or impact of artists' chart careers.

Finally, two product-moment correlations were calculated to determine the degree of consensus between the U.K. and U.S.A. record sales charts on measures of both albums and singles chart impact (i.e. between UKAIMPACT and USAIMPACT, and between UKSIMPACT and USSIMPACT). The resulting coefficients were +0.47 and +0.37 respectively ($N = 200$, $p < 0.001$ in both cases). Although rather low in magnitude, these correlations indicate that there is consensus between two countries on behavioural measures of the popularity of the 200 artists.

General Discussion

In summary, this study investigated a range of archival measures and also subjects' own eminence selections: a variety of statistical analyses indicated that there was a general consensus both within and between these measures. This corresponds with Farnsworth's conclusions, showing that we agree on what constitutes good taste within pop music.

However, the general degree of consensus that was evident in the data tended to break down under certain circumstances. Perhaps the clearest case of this was the way that different age groups tended to select artists from different decades between 1955 and 1994: the nature of these differences between the age groups is consistent with the effect of some 'critical period' in the determination of musical taste which occurs in late adulthood and early adolescence (see Figure 21.1). More simply, each generation

has its own pop music. This allows speculation about two points that might be regarded as possible hypotheses for future empirical research. These both concern the possible implications of Figure 21.1 with regard to the occasional revival of young people's interest in the pop music of certain periods: these 'revivals' seem to be a notable feature of pop music tastes.

First, the differences between the age groups evident in Figure 21.1 may help to explain the nature of these revivals of young people's interest. Figure 21.1 shows that preference for other decades tends to decrease with the distance of those decades from that which subjects most preferred (e.g. if subjects' most-preferred decade was 1985-1994, then their next most preferred decade was 1975-1984, and so on for adjacent decades). This may relate to the way that revivals in pop music have typically involved the music from temporally proximate periods. For example, during the 1970s the U.K. witnessed a revival of young people's interest in 1950s rock & roll; the 1980s gave rise to a revival of young people's interest in soul and psychedelic rock from the 1960s; the 1990s have given rise to a revival of young people's interest in bands from the 1970s and early 1980s (e.g. ABBA), and musical styles from that period such as punk and new wave. In short, these revivals in young people's interest seem to reflect Figure 21.1 in that artists are more likely to be revived as they are closer to young people's 'critical period': artists from temporally distant periods seem less likely to be revived. Second, the extent to which a given age group neglects the music of less preferred decades may indicate that these revivals of interest in other periods may not be so much *re*-discoveries as *discoveries*. If people are unwilling to expose themselves to pop music from periods other than that which coincided with their own youth, then what are termed 'revivals' may in fact represent the first time that people from certain age groups have encountered the music in question.

Subjects' age also mediated the consensus between their eminence selections and encyclopaedia space allocations, with 25-49 year olds' selections showing the greatest correspondence (i.e. the highest correlations) with these space allocations: in other words, 25-49 year olds were most likely to agree with the music encyclopaedias. This variation between the age groups in their agreement with the encyclopaedias may also explain why there was only a moderate degree of consensus between subjects' overall eminence selections and the encyclopaedia space allocations.

Further evidence that there was only a moderate degree of consensus between subjects' eminence selections and the music encyclopaedia space allocations was that the former demonstrated a 'reverence for the recent' effect (see Figure 21.2) whereas

the latter demonstrated 'reverence for the past' (see Figure 21.3). This suggests that different measures of eminence may produce different results. The correlations between subjects' eminence selections and measures of the record industry's opinion of the artists (TOTALSIN and TOTALALB) were consistent with this view: despite being statistically significant, their rather low magnitude is unexpected given that the record industry must concur with public opinion if it is to survive.

Multiple regression analyses indicated that subjects' eminence selections of artists who had had their first U.K. number 1 single prior to 1975 were associated most closely with their chart *impact*, although this measure was able to predict little of subjects' selections for 1975-1994 artists. More simply, the eminence of older artists is related more closely to their record sales than is the eminence of more recent artists. This raises two further issues. First, in the short term at least, eminence may be related only loosely to record sales: recent artists can be eminent without having achieved the chart success of older artists. It seems likely that a great many other factors may also be involved in the eminence of recent artists, such as their premature death, newspaper and magazine coverage, or *current* position on the record sales charts. All of these factors could be considered by future research. Second, if recent artists can become eminent without having achieved enduring chart success, it follows that eminence is related to but not synonymous with record sales, and perhaps therefore long-term popularity.

In contrast with subjects' eminence selections, encyclopaedia space allocations were associated most closely with the simple *frequency* with which the artists had hit records, and this applied even when pre- and post-1975 artists were considered separately. The number of weeks between the artists' first and last appearance on the charts seemed to be comparatively unimportant, as were the measures of chart impact, and this is rather difficult to explain. Furthermore, subjects' eminence selections and the encyclopaedia space allocations were both associated more closely with success in the album charts rather than the singles charts. This is perhaps less surprising, but it is interesting that success in the singles chart was at times not even related significantly to the two former measures.

Perhaps one of the more unexpected findings concerned the apparent lack of correspondence between the U.K. and U.S.A. in both the albums and singles chart impact of the 200 artists. Despite their high statistical significance, the correlations between these measures indicate a surprisingly low degree of consensus between two countries that are often thought to share many aspects of their pop music cultures.

Perhaps more than any other finding in the present study, these correlations indicate the type of cultural influence on musical taste with which Farnsworth was concerned.

More generally, these results support those of earlier studies (see Chapter 19) in suggesting that pop music charts may constitute reliable sources of data that are also subject to underlying rules. Future research could make much greater use of these charts in testing theories of musical preference with larger and more ecologically valid samples than are possible in the laboratory. For example, one possibility is that record sales data could be used in testing a prediction derived from Berlyne's theory that the length of songs' chart careers should be related to the frequency with which they are played on the radio (i.e. their familiarity; see Erdelyi, 1940; Wiebe, 1940). Similarly, perhaps the probability of a new release reaching the charts depends on the extent to which it is prototypical of the songs that are currently occupying high chart positions: this might explain why fashions in pop music arise so quickly as record companies try to release music that is 'typical' of that produced by one or two successful new acts. In the U.K. for example, the chart success of bands such as Blur and Oasis in late 1994 was followed a few months later by the emergence of a large number of very similar-sounding acts (e.g. Pulp, Supergrass, Menswear, Gene, Sleeper, Echobelly) who now constitute what has become labelled as 'Britpop'.

In conclusion, these results support Farnsworth's assertion that there is general consensus on musical taste. However, consensus in taste for pop music also breaks down according to factors such as the age of the subject, and the means by which eminence is assessed. These findings and the issues raised above provide some indication (and perhaps working hypotheses for future research on the ideas) that different consensuses exist within different cultural groups, and that pop music sales charts may be useful in studies of musical preference at a broader cultural level.

Chapter 22. Age Differences in Tolerance for Musical Styles

Chapter 21 provided some evidence that the perception of musical eminence is related to developmental/acculturational factors, such that artists who were famous during a given subject's *critical period* tended to be regarded as more eminent than other artists from outside this period. The study reported in the present chapter continues this interest in acculturational factors by providing some cross-sectional evidence on age differences in responses to musical styles, investigating differences in the ability to nominate musical styles, and liking for them in subjects aged between 9 and 78 years. As well as the psychological interest that the results of this might have, the promotion of sensitivity towards and tolerance for a wide range of musical styles in children is an important goal of music education in many countries. In the U.K., for example, the National Curriculum guidelines for music stipulate that 14 year olds should be 'developing an awareness of style;...(be able to) improvise and arrange in a variety of styles (and);...use sounds and conventions to achieve a variety of styles' (Department for Education, 1995, p. 7). Empirical data on the development of responses to musical styles might be useful in helping children to achieve these aims.

Perhaps the best known research concerning age influences on responses to musical styles is that carried out within the Project Zero group at Harvard University (see Winner, 1982). A good deal of this work has concerned childrens' stylistic sensitivity, which has been defined operationally as their ability to recognise when two stimuli are or are not derived from the same artwork, or produced by the same artist (Gardner, 1972). For example, in a pioneering study Gardner (1973) presented pairs of classical music excerpts to five age groups of between 6 and 19 years, and found that the ability to determine whether or not the excerpts of each pair were drawn from the same piece increased with age. Castell (1982) repeated Gardner's study with the addition of jazz and pop music alongside classical pieces. She found that children's style sensitivity was greater for pop than for classical music, and also that 8-9 year olds performed at a higher level of accuracy on the pop music pairs than did 10-11 year olds. Castell suggested that the former result occurred because pop music was associated more closely with the children's tastes. She also suggested that the higher level of performance of her 8-9 year olds on pop music pairs was attributable to these children being 'perhaps more 'open-eared' as there might be less social pressure on them to like certain types of music and dismiss others' (p. 25).

LeBlanc (1991) examined the effect of age differences on 'open-earedness', or listeners' tolerance of different musical styles. After a detailed review of the literature

on the effects of maturation on changes in musical preference, LeBlanc proposed a model of the course of these changes which takes the form of four hypotheses, as follows: '(a) younger children are more open-eared, (b) open-earedness declines as the child enters adolescence, (c) there is a partial rebound of open-earedness as the listener matures from adolescence to young adulthood, and (d) open-earedness declines as the listener matures to old age' (p. 2).

Only one recent study has attempted to study changes in stylistic tolerance using subjects from across the entire lifespan. LeBlanc, Sims, Siivola, and Obert (1993) obtained preference judgements from 2262 listeners aged between 6 and 91 years for 30-second recordings of 'art music', trad jazz, and rock. The general pattern of results did conform with LeBlanc's (1991) model for overall responses, as well as for responses assigned within each of the three generic styles. That is, there was an 'adolescent dip' in preference, followed by an increase towards adulthood, and a final decrease in preference in old age.

LeBlanc et al's test of the model has the advantage of covering the whole lifespan within a single research design. However, there are two other important issues that might also be explored. First, LeBlanc et al followed Castell's (1982) and Hargreaves' (1982) original use of the term by defining 'open-earedness' as 'listener tolerance' (p. 4), and operationalising this in terms of preference. It is quite likely that 'listener tolerance' incorporates other aspects as well as preference, such as stylistic knowledge. Stylistic knowledge may not necessarily be related to subjects' age in the same way as preference, even though both variables reflect tolerance of musical styles. A further attraction of a knowledge-based approach to stylistic tolerance is its apparent link with recent research on the more general relationship between categorisation processes and musical preference (see e.g. Martindale and Moore, 1989; Parts A and B of this thesis).

Second, an inevitable methodological limitation of LeBlanc et al's study is its operationalisation of musical styles in terms of specific pieces. There is a practical limit on the number of pieces that can be played to subjects, and this may limit the extent to which responses to these exemplars can be generalised to the styles they are intended to represent. It is also possible that subjects in the study may have been responding to artefactual features of the pieces themselves as well as to the style from which they were drawn. These arguments suggest that it may be also interesting to investigate stylistic tolerance through a complementary, more open-ended approach that does not involve presenting subjects with actual pieces of music, but which

instead allows participants' responses to reflect their own subjective impression of what constitutes a given musical style.

In addition to LeBlanc's model, an alternative explanation of age differences in musical tolerance concerns the effects of acculturation on the familiarity of music. One of the predictions of Berlyne's psychobiological theory (see Chapter 1) is that the familiarity and complexity of stimuli should interact so that as we become more familiar with a stimulus so it also becomes less subjectively complex (i.e. apparently simpler) to us (see Heyduk, 1975). This means that very complex stimuli should be able to sustain a greater degree of familiarity than simpler stimuli before they pass over the peak of the inverted-U and begin to evoke sub-optimal, disliked levels of arousal: in essence, the inverted-U curve between liking and familiarity peaks further to the right for complex stimuli than it does for simple stimuli. Furthermore, maturation and acculturation are associated with increasing familiarity with musical styles. This means that musical styles are more familiar to the old than the young, and this would be expected to influence how arousing the styles are to these age groups (see Colman, Walley, and Sluckin, 1975; Hargreaves and Castell, 1987). Consequently, the curve describing tolerance for musical styles should peak at an earlier age for simpler styles than it does for relatively complex styles.

Before proceeding further, it may be useful to define some of the terms used in this study. Musicologists differ in the ways in which they distinguish between musical idioms, genres, and styles, and this study adopts Nattiez's (1990) model in an attempt to provide an operational distinction between these. The model arranges the generality of musical terms in the form of an inverted triangular hierarchy, with the most general terms at the top, and increasingly specific terms at the bottom. This means that musical *reference systems* (e.g. tonality) are distinct from and superordinate to musical *genres* (e.g. pop, classical, or jazz). In turn, these genres are distinct from and superordinate to the musical *styles* characteristic of particular genres (e.g. disco, baroque, or be-bop respectively for the three genres named above). Such distinctions parallel the debate between Brody (1985) and Serafine (1983; 1985) on the need to differentiate between musical idioms and more general musical reference systems (e.g. tonality), and also as Nattiez points out, the views expressed by Nettl (1964) and Boretz (1972) that musical forms should be discussed in terms of a hierarchical structure.

The present study employed a cross-sectional design to investigate two measures of tolerance towards three musical genres, namely classical, jazz, and rock & pop. The

two measures concerned knowledge- and preference-based aspects of musical tolerance respectively; these were the ability to nominate styles from within these three genres (since as tolerance and awareness of musical styles increases then so should listeners' knowledge of them), and ratings of liking for these nominated styles respectively. The aim was to investigate variations in these measures between 5 age groups representing a wide range of the lifespan. Several hypotheses may be formulated concerning the nature of subjects' responses. First, the findings of LeBlanc (1991) and LeBlanc et al (1993) suggest that children should nominate a greater number of styles than do adolescents, that adolescents should nominate fewer styles than do adults, and that adults should nominate a greater number of styles than do elderly subjects. This pattern should be found within each of the three genres, and also for responses to the three genres overall. Second, if preference- and knowledge-based definitions of stylistic tolerance are similar, then this pattern should be repeated in subjects' preference ratings. Third, if taste is a crucial factor in determining the ability to discriminate musical styles (as Castell (1982) suggests), then we would expect to find positive correlations within each genre between the number of styles nominated and subjects' liking for these styles. Finally, Berlyne's theory implies that liking ratings and the number of styles named should peak in an earlier age group for rock & pop music than for the two generally more complex styles, jazz and classical music.

Method

Subjects The same sample was employed as in Chapter 21. The order in which subjects completed the Chapter 21 study and the one described here was randomised. Subjects were given a 10 minute break between the two studies, and it was stressed that these were completely distinct from one another.

Design and procedure A pilot study was carried out to determine which three genres should be investigated in the main study. The pilot research involved 196 subjects from across the lifespan (range = 9-79 years) who did not participate in the main study. Subjects completed a brief questionnaire which asked them to 'list 8 prominent styles of music'. The three styles nominated most frequently, and subsequently selected for the main study, were 'rock & pop', 'classical', and 'jazz', with 112, 82, and 62 nominations respectively. (The six next most frequently nominated styles each received between 33 and 44 nominations, and were also types of rock & pop music, i.e. rave, indie, dance, soul, and heavy metal).

In the main study, response sheets were completed by groups of approximately 10-20 subjects who were seated in quiet rooms within the educational establishment from which they were recruited. The three items on the response sheet were identical but for the genre they concerned. Each item stated 'In the space below, please list as many types of *classical/jazz/rock & pop* music as you can think of. After writing down each type, please rate how much you like it on a scale from 0 (strongly dislike) to 10 (strongly like). Please put this 'liking' rating in brackets after you have written the type of music. Please spend 5 minutes doing this before moving on to the next question.' An equal amount of space was given beneath each item for subjects to write their responses. In an additional verbal instruction, subjects were told that they could write down anything they considered to be a musical style, but that they should not write down the names of specific composers, performers, or pieces. The researcher then ensured that subjects understood the task, and gave additional explanation if necessary. (In the case of the 9-10 year olds, this was done in conjunction with the class teacher). Subjects then completed the response sheet, and the researcher reminded them when each 5 minute period had elapsed. The 15 minutes allowed to complete the three items proved to be sufficient time for subjects to list all the musical styles they could think of.

Results

Number of styles nominated A series of one-way independent subjects ANOVAs and Tukey HSD tests was calculated to test for differences between the 5 age groups with respect to the total number of styles nominated, and the number of styles nominated within each of the three genres considered. The results of these ANOVAs and the significant differences between age groups are reported in Table 22.1, and the means for each group are illustrated in Figure 22.1.

Liking for musical styles Another series of one-way independent subjects ANOVAs and Tukey HSD tests was calculated to test for differences between the 5 age groups on their liking for all the musical styles they named, and their liking for the styles nominated within each of the three genres considered. The results of these analyses are reported in Table 22.2, and the means for each group are illustrated in Figure 22.2.

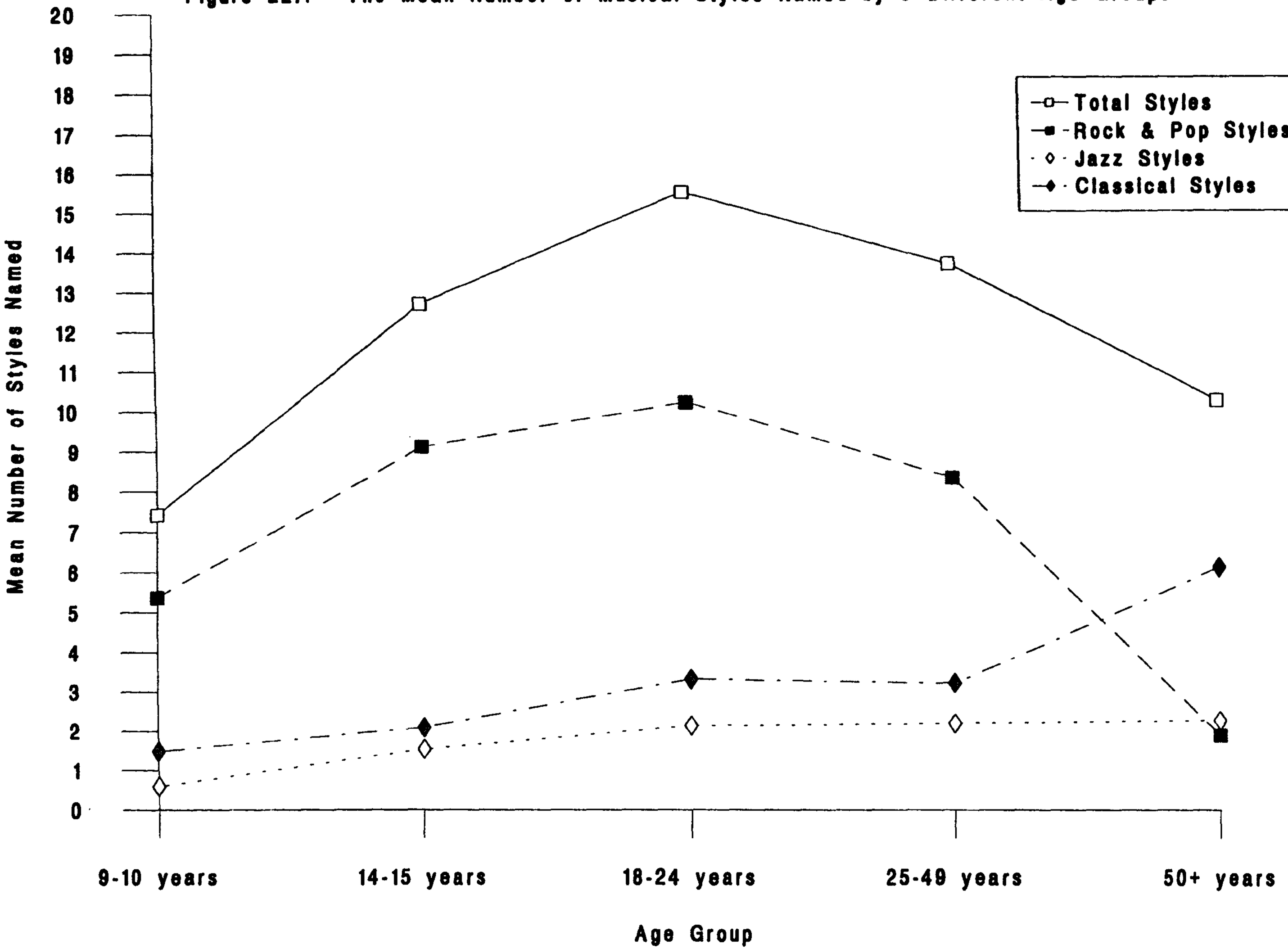
Relationship between style nomination and liking Product-moment correlation coefficients were calculated within rock & pop, classical, and jazz music responses to investigate the relationship between the number of styles nominated and mean liking

Variable	Means for 9-10 years	Means for 14-15 years	Means for 18-24 years	Means for 25-49 years	Means for 50+ years	F	d.f.	p
Total number of styles named	7.42^{abc}	12.69^{ad}	15.51^{bde}	13.67^{cf}	10.21^{ef}	36.49	4, 269	< 0.001
Number of rock & pop styles named	5.37^{abc}	9.10^{ad}	10.21^{bef}	8.30^{ceg}	1.88^{dfg}	43.06	4, 269	< 0.001
Number of classical styles named	1.48^{abc}	2.07^{de}	3.30^{adf}	3.20^{bg}	6.08^{cefg}	26.50	4, 270	< 0.001
Number of jazz styles named	0.59^{abcd}	1.52^{a}	2.11^{b}	2.17^{c}	2.25^{d}	17.10	4, 270	< 0.001

Within each variable, means marked by similar letters differ at the $p < 0.05$ level

Table 22.1 - The effect of age on the number of musical styles nominated

Figure 22.1 - The Mean Number of Musical Styles Named by 5 Different Age Groups

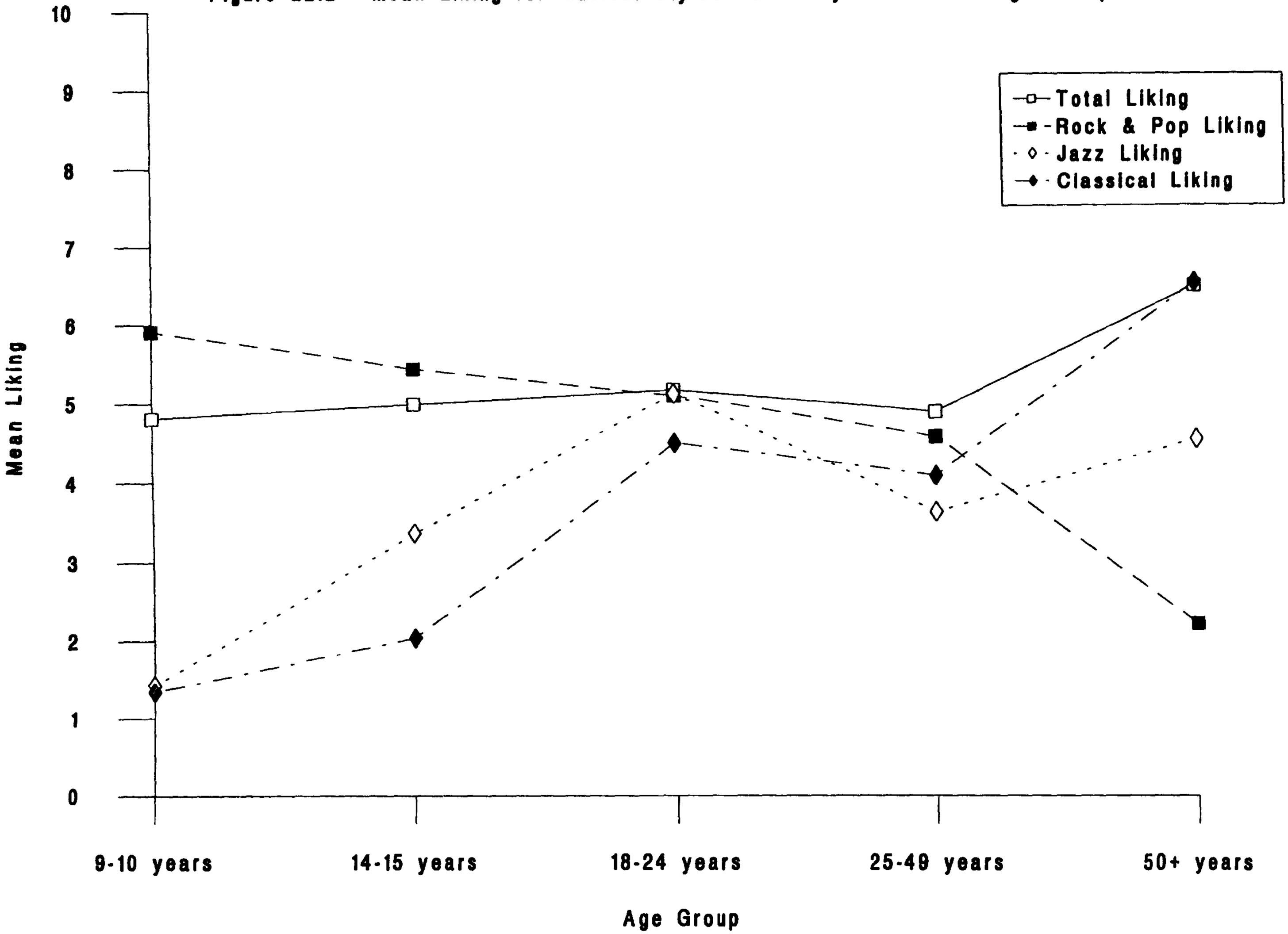


Variable	Means for 9-10 years	Means for 14-15 years	Means for 18-24 years	Means for 25-49 years	Means for 50+ years	F	d.f.	p
Liking for all styles	4.81[a]	4.98[b]	5.16[c]	4.87[d]	6.47[abcd]	5.41	4, 267	< 0.001
Liking for rock & pop styles named	5.91[abc]	5.42[d]	5.09[ae]	4.56[bf]	2.21[cdef]	21.21	4, 269	< 0.001
Liking for classical styles named	1.34[abc]	2.03[def]	4.49[adg]	4.07[beh]	6.51[cfgh]	31.32	4, 268	< 0.001
Liking for jazz styles named	1.43[abcd]	3.36[ae]	5.11[be]	3.62[c]	4.53[d]	16.38	4, 268	< 0.001

Within each variable, means marked by similar letters differ at the $p < 0.05$ level

Table 22.2 - The effect of age on liking for nominated musical styles

Figure 22.2 - Mean Liking for Musical Styles Named by 5 Different Age Groups



for those styles. The resulting coefficients were +0.18 ($N = 273$, $p < 0.01$), +0.59 ($N = 273$, $p < 0.001$), and +0.60 ($N = 273$, $p < 0.001$) respectively.

Discussion

Figure 22.1 indicates that the total number of styles nominated by subjects across all three genres was broadly consistent with LeBlanc's model. Generally speaking, the total number of styles named tended to increase into early adulthood, and then declined in the older age groups. However, this measure did not decrease between 9-10 years and 14-15 years as the subjects entered adolescence, and this is more difficult to reconcile with LeBlanc's prediction that children should demonstrate greater tolerance for musical styles than should adolescents. Despite this, the present finding still makes intuitive sense, since the youngest age group had had comparatively little time in which to be exposed to a range of musical styles, and this would cause them to nominate a smaller number of styles than other age groups.

A similar explanation may well also apply to the number of styles that subjects were able to nominate within the three genres. Figure 22.1 indicates that only the results for rock & pop music were consistent with LeBlanc's model. As with the total number of styles named, the number of rock & pop styles named increased across the age groups into early adulthood before declining in older age groups, and the lack of an 'adolescent dip' could again be attributable to 9-10 year olds having experienced relatively little acculturation as compared with the 14-15 year olds. However, the data for the number of classical and jazz styles named is harder to reconcile with LeBlanc's model. The number of classical styles named showed a general upward trend across the entire range of age groups considered, and the number of jazz music styles nominated at first increased between the 9-10 and 14-15 year old age groups, and then remained constant over the remaining age groups.

These latter two findings cast some doubt on the extent to which the curve for the total number of styles named corresponds with LeBlanc's model. If the number of classical styles named increases over the age groups whilst the number of jazz styles named increases and then levels out, then the number of rock & pop music styles must be the principal cause of the inverted-U relationship evident in Figure 22.1 between age and the total number of styles named: the number of jazz and classical styles named would only cause the curve for the total number of styles named to remain constant or increase slightly. Also, knowledge of rock & pop music may have been lower in the older age groups simply because they had not had the same intensity of exposure to

this style as younger subjects (i.e. an age cohort effect): older subjects in future years may not be subject to such an effect, leading to a general increase in this measure across the lifespan. The number of classical (and perhaps also jazz) styles named indicates that knowledge of musical styles may simply increase over the age groups considered, perhaps reflecting differences in their degree of acculturation: the longer you are exposed to musical styles, the more you learn about them.

Evidence for the putative distinction between preference- and knowledge-based aspects of tolerance is presented in Figure 22.2, which illustrates that differences in the musical *preferences* of the age groups took a different form to the differences in the number of styles these groups nominated. Four clear patterns are evident from Figure 22.2 (see also Table 22.2). First, total liking for the musical styles is constant across the age groups, except for the 50+ year old subjects, who gave higher ratings. Second, liking for styles of rock & pop music decreases steadily across the age groups. Third, liking for styles of classical music increases generally across the age groups despite a (non-significant) decrease between the 18-24 and 25-49 year old groups: liking for jazz music styles increases at first across the age groups and then generally levels off. Finally, liking for the three genres seems to cross over in middle age, representing a change in preference from rock & pop to classical and jazz music in the older subjects. These four curves are quite different to the predictions of LeBlanc's model.

Despite the apparent discrepancies between knowledge- and preference-based aspects of musical tolerance that the two figures suggest, there is also evidence that these two measures are sampling two components of a superordinate construct. Positive correlations were found within each of the three genres between the number of styles nominated and subjects' liking for them. Despite the discrepancies between the patterns revealed in Figures 22.1 and 22.2, these correlations indicate that the two measures of musical tolerance employed here were positively and significantly related to each other. It is also worth noting that the correlation for rock & pop responses was much lower ($r = +0.18$) than those for classical and jazz responses ($r = +0.59$ and $+0.60$ respectively). This is difficult to explain, but might be because rock & pop music receives more media coverage than other styles, thereby increasing subjects' knowledge of it without necessarily having the same effect on liking.

The discrepancy between the present results and the predictions of LeBlanc's model deserves further comment. The most obvious reason for this divergence is a methodological one. LeBlanc et al (1993) presented subjects with specific musical

excerpts and measured responses to these, whilst the present study took a more open-ended approach in which subjects nominated their own musical styles and stated their liking for them. The difference between the results elicited by these two techniques suggests that variations in musical tolerance between different age groups may be dependent on people's familiarity with the music in question. That is, age differences may be related to tolerance in one way when people respond to given musical stimuli (such as those employed in LeBlanc et al's study), and another way when people generate and respond to their own musical stimuli (as in the present study).

This may explain why the present study failed to identify decreases in musical preference in both the adolescent and elderly age groups, in contrast with LeBlanc's research and also with an earlier study of adolescent musical preference by Hargreaves, Comber, and Colley (1995) in which children responded to a given set of verbal musical style labels. The use of self-elicited stimuli in the present study suggests that the absence of these decreases in tolerance is because adolescents and the elderly may like the music they listen to as much as any other age group likes the music that it listens to: they may not like the kinds of music with which they are presented by researchers. It might perhaps be more accurate to say that adolescents and the elderly are not simply less tolerant of music than other age groups: rather, they may be tolerant of different types of music with different stylistic labels to those that other age groups might identify and like. Indeed, it is perhaps noteworthy that 50+ year olds overall liking for the nominated styles was actually significantly higher than for the other age groups, rather than being lower as predicted.

This idea that different age groups were tolerant of different types of musical styles is supported by an informal content analysis of the actual styles nominated by each age group. Although certain styles tended to be be nominated by all 5 (e.g. 'rock 'n' roll', 'opera', 'blues'), there was also a pronounced tendency for different age groups to name certain styles to the exclusion of others. For example, when nominating styles of rock & pop, older subjects tended to nominate pre-1950s popular music styles such as 'music hall' or 'jive', and would often describe post-1960s rock & pop music with a single label. In contrast, younger subjects tended to nominate much newer styles such as 'jungle', or 'rap', and very few under-25s named pre-1950s styles. Similarly, when nominating styles of classical music, older subjects were more likely to name conventionally-recognised styles (e.g. 'baroque' or 'chamber music'), whereas subjects under 25 years of age would often nominate styles that were much more descriptive and unconventional in nature such as 'orchestral', or 'religious'. In 9-10 year olds this effect also carried through to a lesser extent to the rock & pop styles they sometimes

nominated, such as 'mad', or 'sexy songs'. This indicates that particularly in the case of rock & pop, different age groups tend to attach different meanings to the same generic musical label, and so it is interesting that similar distinctions between the age groups were virtually non-existent when nominating styles of jazz.

It was noted earlier that the effects of maturation on musical tolerance may be related to acculturation and the arousal-evoking qualities of musical styles. This psychobiological approach implies that liking ratings and the number of styles named should both peak in a younger age group for rock & pop music than for the two generally more complex styles, jazz and classical music: this is precisely what occurred in the present results. In both Figures 22.1 and 22.2, tolerance for classical music generally increased over the different age groups, and tolerance for jazz music at first increased and then levelled off. In contrast, knowledge of rock & pop music peaked in the 18-24 year old group (see Figure 22.1), and preference for rock & pop showed a general decline over the age groups (see Figure 22.2). This provides some tentative initial evidence that musical tolerance might be related to the effects of acculturation and increasing familiarity with musical styles of differing complexity.

If verified by future research, such an arousal-based process would have interesting implications regarding the nature of the relationship between musical tolerance and age. If subjects' responses concern mainly simple music (for which tolerance should peak early on), this would suggest that stylistic tolerance *declines* generally with increasing age: if their responses concern mainly complex music (for which tolerance should peak later), this would suggest that stylistic tolerance *increases* generally with increasing age. Furthermore, the rate of these increases or decreases between different age groups should vary with the degree to which subjects are exposed to the music in the course of everyday life (i.e. their degree of acculturation), and consequently how familiar it was to them. In short, there may be no single pattern that relates maturation to musical tolerance: rather we should consider the specific nature of the music in question, and the degree of listeners' acculturation to it. This arousal-based approach perhaps complements LeBlanc's model and also any broader cultural influences such as a given cohort's exposure to different musical styles: future research could investigate the extent to which psychobiological processes may underlie the social and cultural effects on tolerance considered by LeBlanc's model.

In conclusion, this study has revealed some consistent age differences in musical tolerance, which seem to differ in some respects from the predictions of LeBlanc's model. These discrepancies allow the model to be extended in two ways: first, by

showing that age differences in musical knowledge can be distinguished from age differences in musical preference: 'musical tolerance' may have several components. Second, the age differences in knowledge and preference in this study indicate the importance of the methodology by which these are assessed: responses to pre-determined stimuli may differ from responses to more open-ended stimuli. It is also possible to speculate that arousal-based factors and cohort effects may influence the relationship between age and musical tolerance, and these deserve to be followed-up by future research. More generally, this study demonstrates that different age groups indicated different types of musical tolerance at one given point in time: this shows that the course of musical development is influenced by the broader cultural context in which it occurs.

This apparent contextual influence corresponds with the general themes of the two previous studies in this part of the thesis, which also implicate the role of cultural factors in aesthetic responses. Chapter 20 provided some evidence that there is general agreement concerning artistic eminence, and that temporal and perhaps also geographical factors may be related to these responses. Similarly, Chapter 21 indicated that there is agreement between a variety of sources over which pop musicians are 'eminent', but also demonstrated that cultural influences such as the context of subjects' development can cause this consensus to break down. In conjunction with the study described above, these findings indicate the influence of the cultural context in which people make aesthetic judgements. This in turn corresponds with Parts B and C of the thesis which indicate that more immediate and localised social and cultural influences can have a similar effect. It is this repeated influence of the context of musical behaviour that perhaps best characterises the majority of the research in this thesis, and forms the basis of its conclusion.

Part E. Conclusion: Social Psychology and Responses to Music

Chapter 23. Conclusion: Social Psychology and Responses to Music

Part A of this thesis provided some evidence on how theories of aesthetic response might be extended to explanations of liking for musical styles and emotional responses to music, and also suggested that these theories may be related to one another more closely than previously thought. Although these investigations are informative in their own right, Part A is also limited by its strong bias towards context-independent laboratory studies. In contrast, Parts B-D of the thesis provide several examples of how responses to music are not made in a 'social vacuum', but are instead linked inextricably to the context of musical behaviour. This suggests that it is impossible to capture this behaviour fully by means of the conventional experimental paradigms employed in a great deal of research on aesthetic responses.

Part B demonstrated that music is part of people's more general lifestyle, since musical preference is related to the listening context (Chapters 8, 9, 10, 11, and 12), and may interact with it (Chapter 14), helping to optimise responses therein (Chapters 11 and 13). Music is a part of, and a potential aid to, everyday experiences. Part C considered the extra-musical information that people bring with them in responding to musical stimuli. Aside from the existing data on prestige and conformity effects, Part C indicates that other types of information such as stereotyping and the physical appearance of music performers may be important social features of people's everyday musical behaviour that are neglected by conventional laboratory research. Finally, along with demonstrating a considerable degree of consensus between different means of investigating artistic eminence, Part D indicates that the broader culture in which people develop and live also influences their aesthetic responses. These arguments and findings indicate that music is related to people's more general everyday experiences in the real world.

If such real-world influences are prevalent but largely neglected, this seems to suggest the need for a social psychology of responses to music. Indeed, Parts B-D of this thesis have been ordered so as to reflect one possible paradigm for the discipline. Doise (1986) proposed that there are four levels of explanation in social psychological research. The first is the *intraindividual* level, at which we investigate the mechanisms (e.g. cognitive and perceptual) by which people appraise and organise the social environment. The second is the *interindividual* and *situational* level, which deals with the processes which occur between different individuals within a given situation, such as a small group, but which does not take into account the positions or roles that the participants occupy outside that situation. These first two levels clearly correspond

with that of Part B of this thesis. At the third, *social-positional* level, the emphasis moves beyond the immediate situation to differences in social position, such as different group memberships. This level relates to that of Part C of the thesis, and particularly Chapter 17 on the stereotyping of musical taste. Finally, the fourth *ideological* level deals with the broader cultural systems of beliefs, representations, and norms that people take with them into experimental situations, and this relates to the findings of Part D.

Indeed, it should be noted that the research reported here corresponds with a current trend within music psychology as a whole toward studying the effect of social factors on musical behaviour. Whilst earlier authors took a more theoretical than quantitative approach to this issue (e.g. Merriam, 1964; Meyer, 1956), Hargreaves and North (in press) have proposed recently that several distinguishable topics now exist within the social psychology of music, such as personality; gender; small group processes (e.g. conformity); societal influences (e.g. taste publics); musical performance (e.g. the role of body language) and performance anxiety; the roles of nature and nurture in the acquisition of musical skill; music and consumer behaviour; and certain features of music education (e.g. pupil-teacher interaction).

A feature which the above topics share with the research reported in this thesis is that they typically reflect social psychological *issues in* musical behaviour, rather than the application of social psychological *theories to* musical behaviour. For example, with few exceptions (e.g. Chapman and Williams, 1976), studies of conformity effects on musical preference tend to be conducted more in terms of whether such effects exist, with little reference to current social psychological theories of group processes. (See also Chapter 17, on stereotyping, for a similar example). Future research on aesthetics might well benefit by directly applying social psychological theories to musical behaviour. Chapter 3, for example, showed that a more general model of affect may explain which emotions a given piece of music is perceived as expressing, and Chapter 18 indicates that the results of more general research on physical attractiveness may generalise to the musical domain. Future research on the social psychology of musical taste which explicitly addresses other aspects of more general social psychological theory (on e.g. attitude) might yield similarly encouraging results. One consequence of such an approach would be to vastly increase the theoretical sophistication (and our understanding) of a field that is still very much in its infancy. A further attraction of future research on musical preference which drew on social psychological theories is that it would move aesthetics and psychomusicology back

towards the mainstream of psychology: research on musical preference would shed light on more general social psychological principles.

The research reported here may also be relevant to two other more specific areas of academic research. First, recent years have witnessed a growing academic interest in consumer behaviour, which has been investigated by anthropologists, sociologists, social psychologists, philosophers, and economists (see Holbrook, 1987): the prevalence of music in commercial environments means that psychomusicology may also provide some useful input to this field. In particular, it is worth noting that the majority of consumer research on music has tended to concentrate on the commercial implications of a given musical stimulus being simply liked, with little consideration of why preference for particular pieces should occur in the first place (see review by Bruner (1990), and also Chapters 7 and 12). Whilst a few of the preceding chapters have commented on some specific commercial implications of the findings they report, psychomusicological investigations could make an obvious more general contribution to consumer research by explaining *why* a particular piece should be liked: a better understanding of those variables and mechanisms which underlie responses to musical stimuli would allow retailers to select and employ music far more effectively in specific commercial environments.

In light of this, it is interesting that psychomusicological and consumer research currently seem to be following parallel paths. For example, in a frequently cited paper MacInnis and Park (1991) have argued that music in television advertisements may have commercial benefits (e.g. increased likelihood of product purchase) if it 'fits' that advertisement, or corresponds with 'consumers' subjective perceptions of the music's relevance or appropriateness to the central ad message' (p. 162). In essence, they propose that music which fits the advertisement should be effective because it primes relevant beliefs about the product, e.g. sophisticated classical music in an advertisement for perfume. There is an obvious parallel between this and the research on prototypicality/appropriateness reported here, and also the more general current interest in musical preference and categorisation processes indicated by those studies reviewed in Chapter 1.

A second research area that may relate to the present findings concerns aesthetic responses to art forms other than music. The studies reviewed in Chapter 1 illustrate how theories of aesthetic response have generally been regarded as non-domain-specific, so that a theory of musical preference may also explain responses to the visual arts or even furniture (e.g. Whitfield, 1983). This raises the interesting issue of

the extent to which the findings described in this thesis might generalise to other artistic domains.

For example, in light of the findings presented in Part A of the thesis, it would be interesting to determine whether the emotions perceived within films, books, and paintings can also be predicted by the adaptation of the circumplex theory employed in Chapter 3. Also, is a person's liking for a book related to the extent to which its plot line is typical of those that the person has read previously ? In a similar vein, Part B of the thesis demonstrated a relationship between music and the listening situation, and so it might also be interesting to investigate whether liking for a painting is related to liking for the general environment in which it is hung. Also, should an architect design a new university building so that it is typical and appropriate with regard to those around it ? Part C showed that musical taste is stereotyped and that performer attractiveness may influence responses to music, but are there stereotypes (or prototypes) of certain cinematic genres for example, and do these relate to viewers' preferences ? Similarly, is a book with an attractive cover more likely to be purchased than one whose cover is less appealing ? Finally, given the findings presented in Part D of the thesis, it would be interesting to investigate whether the eminence of authors is related to the amount of literary criticism they receive and their best-seller rankings in the same way as for pop musicians. Similarly, how does stylistic tolerance for television programmes or paintings develop across the lifespan ?

Questions of this nature obviously await future investigation. In the meantime, this thesis has provided some evidence regarding them in relation to musical stimuli. It has shown that social influences such as the listening environment, certain types of extra-musical information, and the general cultural context are related to musical behaviour, and that these relationships may sometimes be explained in terms of theories derived from context-independent laboratory studies. Taken together, this suggests that there is a need for a social psychology of musical taste which recognises the reciprocal influence between music and its broader social and cultural context. Existing theories of musical preference may be of use in explaining the effect of some these influences, although the greater use of explicitly social psychological theories may be beneficial or indeed necessary in explaining others. It is only by recognising and accounting fully for musical *and* social factors that we can arrive at a better understanding of responses to music in the real world.

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Appendices

Appendix 3.1 - Experimental Stimuli in Chapter 3

Jon Hassell - *Masque*; P.M. Dawn - *To love me more*; Paul Lansky - *Idle chatter*; C.J. Lewis - *Sweets for my sweet*; Wet Wet Wet - *Goodnight girl*; Curtis Roads -*Nscor*; Betty Boo - *I'm on my way*; Toni Braxton - *Breath again (Reprise)*; James Dashow - *Sequence symbols*; Undercover - *I want to stay with you*; Fuse - *Theycch*; Enigma - *Callas went away*; Michael Waisvisz - *The hands movement 1*; Heavy D And The Boyz - *Now that we found love*; Enya - *Watermark*; Jon Hassell - *Flesh of the spirit* (P); Undercover - *September*; B-52s - *Love shack*; Clarence Barlow - *Relationships for melody instruments*; Enya - *Smaointe*; Enya - *Miss Clare remembers* (P); Michael Waisvisz - *The hands movement 2*; All About Eve - *The pearl fishermen*; Stephen Kaske - *Transition nr. 2*; Take That - *I found heaven*; Clannad - *Theme from 'Harry's Game'*; C & C Music Factory - *Things that make you go hmm*; Aphex Twin - *Tha* (P); Recoil - *The sermon*; Enya - *Exile*; Jon Hassell - *Ravinia/Vancouver*; Sub Sub - *Ain't no love* (P); Sade - *Mermaid*; Klaus Schulze - *Yen*; Bizarre Inc - *Raise me*; James Brown - *Living in America.*

(P) denotes practice excerpt

Appendix 4.1 - Experimental Stimuli in Chapter 4

<u>Experimental pieces</u>

Hey Jude, *Michelle*, *Penny Lane*, *Yesterday*, and *Eleanor Rigby*

<u>Styles, artists, and titles of source recordings</u>

Light Orchestral: The James Last Orchestra - *James Last plays the greatest songs of The Beatles.*

Steel Band: The Red Stripe Ebony Steel Band - *Popular Beatles songs.*

Karaoke: Karaoke Legends - *Lennon and McCartney.*

Pop: Excerpts taken from the original recordings by The Beatles.

Jazz: Elena Duran, Stephane Grappelli, and Laurie Holloway - *Bach the The Beatles.*

N.B. Since all the excerpts within a style were required to be performed by the same artist, it was impossible to locate a jazz version of *Penny Lane.*

Appendix 5.1 - Musical Styles (and Representative Excerpts) in Chapter 5

Military (The Regimental Band Of The Royal Hampshire Regiment - *The Hampshire*); Christian Religious (Queen's College Choir - *Faire is the Heaven*); Trad Jazz (Acker Bilk And His Paramount Jazz Band - *Marching through Georgia*); Romantic Period Classical (John Ogden With The Philharmonia Orchestra - *Tchaikovsky's Piano concerto no. 1 in B flat minor op. 23*); Traditional Scottish (Denny And Dunipace Pipes And Drums - *The rose among the thorn*); Heavy Metal (Iron Maiden - *Run to the hills*); Indian Folk (Loksagarnaan Moti - *Gujurati title*); Baroque (The Amsterdam Baroque Orchestra - *Telemann's Tafelmusik*); Brass Band (Britannia Building Society Band - *Showers of gold*); Country (The Bellamy Brothers - *Let your love flow*); Soul (Sade - *I couldn't love you more*); Big Band Dance (The Glenn Miller Orchestra - *In the mood*); Bhangra (Red Rose - *Nachla ni nachla ni nachla*); Rock 'n' Roll (Elvis Presley - *Guitarman*); American Folk (Joni Mitchell - *Nathan La Freneer*); Classical (Rutland Sinphonia - *Elgar's Carillon op. 75*); Be-Bop Jazz (Dizzy Gillespie and Charlie Parker - *Shaw 'nuff*); Rap (De La Soul - *Ooodles of O's*); World (The Boyoyo Boys - *Eloff Street no. 2*); Blues (Robert Johnson - *When you got a good friend*); Grunge (Nirvana - *Smells like teen spirit*); Light Opera (D'Oyly Carte Opera Company - *Gilbert And Sullivan's I am the very model of a modern major general*); Current Chart Pop (Cathy Dennis - *Irresistible*); Easy Listening (Bing Crosby - *Where the blue of the night*); New Age (Michael Brook - *Ultramarine*); Indian Classical (Baluji Shrivastav And Sarwar Sabri - *Raag shuddha sarang drut gat in teental*); Avant-Garde Jazz (Garbarek, Vitous, and Erskine - *Clouds in the mountain*); Ambient House (Aphex Twin - *Aegispolis*); Humorous (The Muppets - *I'm in love with a big blue frog*); Opera (Luciano Pavarotti - *Rossini's Larga al factotum*).

Appendix 6.1 - Experimental Stimuli in Chapter 6

Michael Brook - *Urbana*; Cocteau Twins - *Suckling the mender*; Simple Minds - *Someone up there likes you*; Duran Duran - *Tiger tiger*; Jean Michel Jarre - *Tokyo kid*; Tangerine Dream - *Melrose*; Tangerine Dream - *Three bikes in the sky*; Japan - *Canton*; David Bowie and Gorgio Moroder - *The myth*; Enya - *After ventos*; Britt

Fairclough - *Ode to Barbara Mallen*; Jean Michel Jarre - *Oxygene part IV*; Mick Karn - *Tribal dawn*; Lush - *Scarlet II*; Mike Oldfield - *Weightless*; Enigma - *Callas Went Away*; Suzanne Ciani - *Mosaic*; Suzanne Ciani - *Summer's day*; Cocteau Twins - *Fotzepolitic*; Cocteau Twins - *Cico buff*; Paul Mergener and Michael Weisser - *Power of independence* (P); Michael Brook - *Shona bridge*; Michael Brook - *Red bridge*; Jon Hassell - *Ravinia/ Vancouver*; Jon Hassell - *Pagan*; Jon Hassell - Mombassa; Cocteau Twins - *Spooning good singing gum*; Brian Eno - *Ju ju space jazz*; Klaus Schulze - *Gringo nero*; Klaus Schulze - *Trancess*; Klaus Schulze - *Brave old sequence*; Klaus Schulze - *The big fall*; Klaus Schulze - *The big fall* (see note 1); Aqua Regia - *Aqueanosolo*; Paul Lansky - *Idle chatter*; James Dashow - *Sequence symbols*; C. Barlow - *Relationships for melody instruments*; S. Kaske - *Transition nr.2*; Denis Smalley - *Clarinet threads*; Tangerine Dream - *Song of the whale part 1*; Kraftwerk - *Kometenmelodie 2*; Amnon Wolman - *A circle in the fire* (P); Software - *Julius-dream*; Dead Can Dance - *As the bell rings the maypole spins*; B12 - *Basic emotion*; B12 - *Telefone 529*; David Bowie and Gorgio Moroder - *Irena's theme*; Jean Michel Jarre - *Oxygene part II*; Extreme - *Trasparenza*; Suzanne Ciani - *Aegean wave*; Fuse - *A new day*; Fuse - *Theycch*; Jon Hassell - *Courage*; Michael Brook - *Ultramarine*; Michael Brook - *Lakbossa*; Paul Mergener and Michael Weisser - *Timber-wave-reflections*; Brian Eno - *Distributed being*; System 7 - *Over and out*; Recoil - *Stone*; Recoil - *The sermon*; Recoil - *2*; Tangerine Dream - *Poland* (P); Tangerine Dream - *Astral voyager*.

Notes:

(1) This second excerpt was so different from the preceding item as to justify its inclusion as a separate excerpt.

(2) (P) denotes practice excerpt.

Appendix 8.1 - Experimental Stimuli in Chapter 8 (And Mean Complexity Ratings)

High complexity new age Jon Hassell - *Ravinia/Vancouver* (9.03); Clarence Barlow - *Relationships for melody instruments* (8.10); Denis Smalley - *Clarinet threads* (9.21); Stephen Kaske - *Transition nr. 2* (9.44).

Low complexity new age Recoil - *The sermon* (1.10); Tangerine Dream - *Astral voyager* (2.26); Aphex Twin - *Tha* (2.37); Fuse - *Theycch* (1.90).

Moderate complexity new age Enya - *After ventos* (4.60); Cocteau Twins - *Fotzepolitic* (5.21); Enigma - *Callas went away* (4.88); Tangerine Dream - *Song of the whale part 2* (5.30).

Moderate complexity organ music L. James - *Walkin' my baby back home* (4.90); Ronald Curtis - *A nightingale sang on Berkeley Square* (4.63); From 'The Best of the Mighty Marenghi Fairground Organ' - *March of the cobblers* (5.18); From 'The Best of the Mighty Marenghi Fairground Organ' - *South Rampart Street parade* (5.32).

Appendix 9.1 - Experimental Stimuli in Chapter 9

Introduction excerpt Tangerine Dream - *Poland.*

Experimental excerpts Fuse - *Theycch*; Tangerine Dream - *Astral voyager*; Enigma - *Callas went away*; Brian Eno - *Ju ju space jazz*; Jon Hassell - *Ravinia/Vancouver.*

Final excerpt Enya - *Watermark.*

Appendix 12.1 - Experimental Stimuli in Chapter 12

High complexity new age excerpts Jon Hassell - *Ravinia/Vancouver*; Paul Lansky - *Idle chatter.*

Moderate complexity new age excerpts Enya - *After ventos*; Tangerine Dream - *Song of the whale part 1.*

Moderate complexity british military marching music excerpts The Combined Corps Of Drums Of The 1st And 2nd Battalion Coldstream Guards - *Charlottenburg*; The Regimental Band Of The Royal Hampshire Regiment - *The Hampshire.*

Appendix 13.1 - The Series of Increasingly Coercive Statements Followed By Experimenters in Chapter 13

1) Would you do a questionnaire for me ?

2) It doesn't contain anything personal

3) It is quite interesting

4) It doesn't take long

5) I would really appreciate it

6) Please would you do it since it's for some research which makes up a large proportion of my final degree

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Appendix 18.1 - Experimental Stimuli in Chapter 18

Kitaro - *Nageki*; Software - *Julius dream*; P. Mergener and M. Weisser - *Power of independence*; Fuse - *A new day*; B12 - *Mondrin*; Michael Brook - *Lakbossa*; System 7 - *Over and out*; Recoil - *Stone*; Tangerine Dream - *Song of the whale part 1*; Suzanne Ciani - *Mosaic*; Mick Karn - *Tribal dawn*; Deep Forest - *Night bird*; Vangelis - *Alpha*; Eric Serra - *The big blue overture*; William Orbit - *Gringatcho demento*; Trisan - *May yo I*; Bark Psychosis - *Pendulum man*; Slowdive - *Souvlaki space station*; Jon and Vangelis - *Italian song*; Future Sound of London - *Cascade*.