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# How Music Makes Us Feel

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# HOW MUSIC MAKES US FEEL

by

ALEXANDER ECONOMIDES

Under the Direction of Andrea Scarantino

## ABSTRACT

According to folk psychology, instrumental music regularly elicits emotions in listeners. Philosophers and psychologists such as Kivy, Konecni and Zangwill have questioned the existence of these musically elicited emotions, arguing that instrumental music elicits moods or aesthetic judgments rather than emotions. I defend the folk psychological position against these skeptics. The first chapter sets up the debate surrounding musically elicited emotions, while chapters two and three defend the thesis that instrumental music elicits emotions against the critics' arguments. Chapter four outlines the implications of this defense for a variety of fields.

INDEX WORDS: Emotion, Affect, Mood, Cognitivism, Music, Aesthetics, Psychology, Memory, Expectation

HOW MUSIC MAKES US FEEL

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ALEXANDER ECONOMIDES

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Master of Arts

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## 1. Why musical emotions need defending

The apparent power of music to elicit emotions in humans has been remarked upon for millennia: as the tenth-century Persian scholar Al-Ghazzali put it, ‘The heart of man has been so constituted...[that] it contains a hidden fire which is evoked by music and harmony, and renders a man beside himself with ecstasy’ (Al-Ghazzali, 1909, p. 73). Nevertheless, the folk-psychological belief that music elicits emotions has been strongly questioned by such philosophers and psychologists as Kivy (1989, 1999), Konecni (2003, 2008) and Zangwill (2004, 2007). In this thesis I will address the arguments raised by these authors and conclude that music does regularly elicit emotions, though a wide range of contextual factors can prevent such elicitation.

The arguments of these critics can be broadly divided into two groups: *a posteriori* critiques of the existing data in favor of musically elicited emotions [MEE] (Konecni, 2008a), and *a priori* critiques arguing that only moods or purely aesthetic responses, rather than emotions, could in principle be elicited by music (Zangwill, 2004).<sup>1</sup> These two types of argument are often combined (Kivy, 1999). I will conclude that none of the arguments of these skeptics regarding MEE are decisive, though they raise a number of important issues. For example, I argue that the *a posteriori* critiques made by Konecni (2008a) highlight important methodological traps into which researchers have sometimes fallen, though I believe he drastically overstates the impact these issues have on the empirical support for MEE.

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<sup>1</sup> By ‘*a posteriori* critique’ I mean a critique that accepts that MEE are possible, but argues the existing evidence is methodologically flawed or somehow insufficient to establish their existence.

By ‘*a priori* critique’ I mean a critique that argues that music is simply not the sort of thing that could elicit genuine emotions: instead, music elicits moods, aesthetic responses etc.



Throughout this thesis I will be using ‘music’ as shorthand for ‘instrumental music’. I choose to focus on instrumental music firstly because the MEE skeptics have focused exclusively on this category, and secondly because instrumental music seems to provide the most interesting cases of MEE, as the absence of vocal parts significantly limits the range of possible elicitation mechanisms.

In order to fully address the critiques of Kivy, Konecni and Zangwill I will need to consider the psychological mechanisms that may underpin our emotional responses to music. This discussion is necessary due to a distinction that Kivy (1999), Konecni (2008a) and Zangwill (2004) draw between direct and indirect elicitation of emotions by music. The details of the distinction vary from author to author, but it is essentially meant to exclude ‘indirect’ psychological mechanisms from consideration as sources of MEE. One example of an ‘indirect’ mechanism is memory association; critics of MEE argue that when music evokes an episodic memory in the listener, any emotion that follows cannot be considered a MEE because it is the memory rather than the music that is eliciting the emotion.<sup>2</sup> For example, imagine that I hear Bach’s Goldberg Variations, which remind me of home, and this memory of home makes me feel nostalgic. Kivy, Konecni and Zangwill would say this elicitation is not an instance of MEE. Consequently, they argue that experiments must control specifically for episodic memory associations (along with other ‘indirect’ mechanisms) if they are to support the existence of MEE.

I will argue that this binary distinction between ‘direct’ and ‘indirect’ mechanisms is empirically unwarranted and question-begging. In order to support these claims I will first outline two prominent contemporary theories of the elicitation mechanisms underlying affective responses to

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<sup>2</sup> They accept that ‘indirect’ mechanisms can elicit emotions, but deny that there are any ‘direct’ mechanisms that can do so.

music, namely Juslin and Västfjäll (2008) and Huron (2006). Examples of the mechanisms posited by these theories include musical expectancy (where an affective response is elicited through the fulfillment or undermining of our expectations concerning the future course of the music) and episodic memory associations (see previous paragraph). I will show that neither of these theories supports any clear-cut distinction between ‘direct’ and ‘indirect’ mechanisms.<sup>3</sup> Furthermore, I will show that even a charitable interpretation of the direct/indirect distinction [DID] ends up being highly implausible: consequently, I argue such a distinction is empirically unwarranted. I will further argue that the direct/indirect distinction serves solely as a means for MEE skeptics to rule out evidence that is unfavorable to their position, and is thus question-begging.

The main philosophical implication of the thesis will be that the folk-psychological belief in MEE is warranted, and that none of the major skeptical arguments regarding MEE are persuasive. On the other hand, I will note a number of areas where the evidence in favor of MEE is in need of further development; for example, there is a dearth of ecologically valid studies that examine specific elicitation mechanisms.<sup>4</sup> I will also highlight methodological problems surrounding investigations of MEE: in particular, I argue that some prominent studies (e.g., Krumhansl, 1997) have consistently conflated the expression and elicitation of emotion by music, thereby contaminating the data generated by these studies. These issues are relevant, as they partially vindicate the *a posteriori* critiques offered by Konecni (2008a).

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<sup>3</sup> I will focus on these two theories because they are both especially prominent in the literature. While it might be preferable to survey a wider range of theories, to my knowledge no major existing theory supports a clear distinction between ‘direct’ and ‘indirect’ mechanisms.

<sup>4</sup> A study is ecologically valid when its finding can be generalized to naturally occurring circumstances. For example, an ecologically valid study might use methods, materials and setting roughly approximating the real-life situation under investigation.

The thesis is novel insofar as it presents a detailed response to the skeptical claims of Kivy, Konecni and Zangwill. The few existing responses to these authors have failed to appreciate the range of arguments supporting their positions, thereby neglecting the insights that can be found therein. The question of whether MEE exist is significant because if they do not exist, then folk psychology is in error on this point, and if they do exist, then instrumental music could prove useful as a means of reliably eliciting emotions under experimental conditions.<sup>5</sup> This elicitation method would be of particular interest to researchers investigating emotions such as happiness and sadness that are hard to reliably elicit under laboratory conditions (Koelsch et al., 2006). The existence of MEE would also be of theoretical interest, as it would suggest the existence of non-linguistic and possibly primitive emotion elicitation mechanisms that any satisfactory theory of emotions should be able to account for.

The structure of the thesis will be as follows: in Chapter 2 I will address the *a priori* arguments of the MEE skeptics. In Section 2.1 I will outline three contemporary theories of emotion, as well as discussing the distinction between moods and emotion. I will then present two prominent frameworks for categorizing the mechanisms underpinning MEE in Sections 2.2 and 2.3. These frameworks will then be used to support my criticisms of the direct/indirect distinction in Section 2.4. The remaining *a priori* arguments against MEE will be addressed in Sections 2.5 and 2.6. These critiques center on the idea that emotions essentially involve particular types of judgment or behavioral dispositions (e.g., crying when you are sad), which the skeptics claim are

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<sup>5</sup> The experimental use of MEE would require the identification of strong causal links between specific pieces or musical forms and particular emotions. These causal links would have to be both reliable and relatively context-insensitive in order to prove experimentally useful. There is, of course, no guarantee that such links will be found, but numerous MEE researchers have raised this as a realistic possibility.

absent in MEE. I will respond by arguing that (1) emotions do not essentially involve these features, and (2) there is evidence that MEE can in fact possess these features.

Chapter 3 will deal with *a posteriori* critiques of MEE. I will begin by giving a brief review of the relevant empirical literature (Sections 3.1 – 3.3). The purpose of this review is to suggest that whichever theory of emotion we endorse, there is empirical evidence that gives us good reason to posit the existence of MEE. In Sections 3.4 and 3.5 I will address Kivy's and Konecni's *a posteriori* arguments against MEE, focusing in particular on Konecni's methodological critiques of the contemporary MEE literature. Finally, Chapter 4 will outline the implications of this thesis for a range of fields, as well as highlighting fruitful avenues for further research.

## 2. Laying the foundations for musical emotions

Kivy (1989, 1999), Konecni (2003, 2008) and Zangwill (2004, 2007) all offer *a priori* critiques of MEE. In this chapter I will respond to these critiques, and highlight some problematic assumptions shared by several of them. More specifically, I will call into question the distinction that all three authors draw between ‘direct’ and ‘indirect’ elicitation mechanisms. As anticipated in the previous chapter, I will make the case that DID is empirically unwarranted and question-begging.

In order to respond effectively to these *a priori* critiques and show DID to be empirically unwarranted, it will first be necessary to have a sense of how several major theories define emotions, as well as how we might distinguish between emotions and moods, and what the mechanisms underlying MEE might be. To this end, in Section 2.1 I will outline three contemporary theories of emotion, as well as broadly defining emotions, moods and affective states. In Section 2.2 I will briefly outline two major theoretical accounts of the mechanisms underlying the elicitation of emotions by instrumental music, namely Juslin and Vastfyll (2008) and Huron (2006). The conclusions drawn in this thesis will not be dependent on the details of either theory: they serve primarily to suggest (1) that any comprehensive theory of MEE will need to posit multiple elicitation mechanisms, and (2) that no clear DID can be drawn within the framework of these theories.

### 2.1 Identifying Emotions

The terms ‘emotion’, ‘mood’ and ‘affective response’ are rarely defined in the MEE literature (Juslin & Sloboda, 2010). Even when definitions are offered, they tend to be very imprecise. Furthermore, the definitions offered by MEE defenders and skeptics often vary: these varia-

tions can bog down discussions and obfuscate the points of disagreement. In an attempt to avoid these difficulties, I will now provide a brief overview of several major contemporary theories of emotion. This overview will serve two purposes. Firstly, it will lay the groundwork for my responses to the *a priori* arguments made by MEE skeptics. For example, I argue that some of Kivy's *a priori* arguments rely heavily on a naïve form of cognitivism. In order to make sense of this criticism, we need a clear understanding of cognitivism and its rivals. Secondly, the theories outlined here will shape my survey of the empirical MEE literature in Chapter 3. More specifically, Chapter 3 will provide empirical evidence that should prove persuasive to most of the theories outlined here, with the possible exception of cognitivism.<sup>6</sup>

A typical emotional response has several components. These include thoughts (e.g., the belief that I have just won a prize), feelings (e.g., a deep sense of contentment), physiological changes (e.g., increased heart rate and changes in facial expression) and behaviors (e.g., cheering). One of the primary tasks of a theory of emotion is to tell us which of these components, or which combination of them, *is* the emotion. Further questions concern the causal relations between these components: which come first, and are any of them necessary or sufficient for the occurrence of an emotion? There is substantial disagreement on all of these questions, and I will not be attempting to resolve it in this thesis. Instead, I will outline the answers given by three prominent theories of emotion: (1) the James-Lange theory, (2) basic emotion theories and (3) cognitivist theories.

A supporter of the James-Lange theory of emotion holds that 'we are sad because we cry': physiological responses are the causal drivers of our emotions (James, 1884). This claim stands in stark contrast to our everyday view of emotions, according to which physiological

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<sup>6</sup> See Section 4.4 for a more detailed discussion of the implications of this thesis for cognitivism.

changes are caused by mental changes (e.g. feeling afraid causes me to tremble). While James held that physiological changes were the causal drivers of emotion, he acknowledged the existence of other components of emotional responses such as behavioral dispositions (e.g. running away when frightened). On a James-Lange view, I can be frightened even if there is no specific thought causing my fear. For example, my fear might be elicited extremely rapidly, leaving no time for neocortical involvement (LeDoux, 1996).

If we wish to convince a James-Lange theorist that MEE exist, we need to provide evidence that physiological changes indicative of emotion can be caused by music. While there may be no precise physiological ‘signature’ for every emotion, we can specify suites of physiological responses that accompany prototypical episodes of a particular emotion. For example, James mentions ‘quicken heart-beats’, ‘shallow breathing’, ‘trembling lips’, ‘weakened limbs’ and ‘goose-flesh’ as physiological responses indicative of fear (James, 1884, p. 194).<sup>7</sup> In section 3.3 I survey the evidence suggesting that these changes do in fact occur, including landmark papers such as Krumhansl (1997). Despite its many critics, the James-Lange theory remains highly influential: it has inspired a wave of ‘Neo-Jamesian’ theories of emotion such as Damasio (2003) and Prinz (2004).

‘Basic emotions’ theory states that emotions such as anger, fear and surprise are universal among humans. Ekman (2003) argues that basic emotions are complex, evolutionarily driven responses to types of environmental situations: he refers to these responses as ‘affect programs’. Affect programs co-ordinate behavioral, physiological and cognitive changes. Since these programs were adaptive in part due to their communicative function, Ekman argues that they are each associated with distinctive facial expressions that can be recognized cross-culturally. Fur-

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<sup>7</sup> On the other hand, some theorists have suggested that states of physiological arousal must be cognitively ‘labeled’ in order to qualify as a particular emotion (cf. Schachter and Singer, 1962).

thermore, the duration of the basic emotions is measured ‘not [in] hours or days, but more in the realm of minutes or seconds’, and their onset is rapid (Ekman, 1984, p. 16). The number of basic emotions posited by Ekman has grown over time, from six (Ekman, 1984) to fifteen (Ekman, 1999). Furthermore, Ekman has argued that there are no non-basic emotions (Ekman, 1999, p. 57).

A basic emotions theorist would argue that we could investigate the existence of MEE by testing for the presence of prototypical facial expressions while subjects are listening to instrumental music, as the expressions are culturally invariant and relatively easy to measure. In section 3.3 I discuss the work of Witvliet and Vrana (1996) who find compelling evidence of just such facial expressions using electromyography (EMG).

Finally, cognitivist theories such as Nussbaum (2001) and Solomon (2003) hold that emotions are judgments of a certain kind. For example, sadness might be defined as the judgment that I have suffered an irrevocable loss. The precise formulation of the cognitivist thesis varies from author to author: for example, Nussbaum (2001) defines emotions as ‘appraisals or value judgments’ (p. 4). Furthermore, there is substantial disagreement about whether these judgments have to be consciously accessible.<sup>8</sup> Lastly, authors such as Scarantino (2010) have identified three different ‘varieties’ of cognitivism: I will be concerning myself solely with constitutive and etiological cognitivism.<sup>9</sup> Overall, while the details of cognitivist theories vary, what unites them is an insistence that emotions require judgments: in the absence of the relevant kind of judgment, there can be no emotion.

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<sup>8</sup> This point will be further explored in Section 2.5.

<sup>9</sup> A constitutive cognitivist claims that emotions are *constituted by* judgments of a particular sort, while an etiological cognitivist claims that emotions are *caused by* such judgments.



In addition to these basic types of emotion theory, there are many ‘hybrid theories’ that identify an emotion with some combination of the aforementioned components (Prinz, 2004, p. 10). For example, a ‘somatic feeling’ theory holds that emotions are feelings, but that these feelings are responses to bodily changes (*ibid.*). The somatic feeling theory claims that both feelings and physiological changes are essential to emotion, making it a hybrid theory. Outlining all major hybrid theories lies beyond the scope of this thesis: instead, I will provide evidence that music regularly elicits feelings, physiological changes and neurological activity typical of a range of emotions. This wide range of evidence should prove persuasive to a variety of hybrid theories.

Having laid out a range of theories of emotion, we might wonder what the relationship is between emotions, moods and affective responses. Unfortunately there is little consensus on this question. Some authors view emotions and moods as distinct subsets of affective responses (Juslin & Västfyll, 2008), while others view moods as subsets of emotions (Prinz, 2004). I will opt for the former categorization, as it is more prevalent within the MEE literature (Juslin & Sloboda, 2010, p. 10).

Sizer (2000) provides a useful framework for understanding the distinction between moods and emotions. She argues that moods and emotions lie on a spectrum of affective responses, but maintains that moods are quite different from paradigmatic emotions and thus cannot be explained merely by ‘stretching’ our existing theories of emotion. She characterizes moods as ‘generalized, nonspecific affective states like melancholy, ennui or ebullience’ (Sizer, 2000, p. 2). For example, when I am melancholic my mood does not have any determinate object: instead, it permeates my perceptions, thoughts and desires, making the whole world seem ‘greyer, duller, less livable’ (Haugeland, 1978, p. 223).

Moods thus understood stand in contrast to emotions, which typically have specifiable objects. For example, when I am scared of a snake, the object of my fear is the snake, not the world in general. Emotions are also more likely to be subject to cognitive influence (i.e. they are more cognitively penetrable).<sup>10</sup> For example, if I find out that the ‘snake’ is in fact a garden hose, my fear will typically subside. Alternatively, if I am knowledgeable about snakes and realize that the snake in question is docile and harmless, then this realization will dissipate my fear. A further contrast that is widely accepted in the MEE literature is that emotions tend to be briefer and more intense than moods (Juslin & Sloboda, 2010, p. 10).

While these working definitions are undoubtedly contentious, they can at least provide us with a shared starting-point for a discussion of MEE and help to avoid some terminological confusion. I will be focusing solely on music’s potential to elicit emotions: if Sizer is right in arguing that moods and emotions are distinct phenomena, then it remains an open question whether music can also elicit moods. Furthermore, I will not be committing myself to the truth of any particular theory of emotions: I will argue that the empirical evidence provided in Chapter 3 should prove persuasive to a range of theories (see Section 3.1 for further details).

## **2.2 A taxonomy of elicitation mechanisms – Juslin & Vastfyall’s 7-part theory**

Juslin and Vastfyall (2008) posit the existence of seven distinct elicitation mechanisms for MEE.

<sup>11</sup> These mechanisms are not meant to be mutually exclusive: several of them can be active in any given case of emotion elicitation. Furthermore, the same emotion (e.g., happiness) can be

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<sup>10</sup> A process is cognitively penetrable if ‘its performance depends on and is explained in virtue of what the system represents (the beliefs, goals, and knowledge of the agent)’ (Sizer, 2000, p. 15).

<sup>11</sup> Juslin & Vastfyall’s working definitions of emotions and moods are very similar to the definitions outlined in Section 2.1 (Juslin & Vastfyall, 2008, p. 3).

elicited by different mechanisms on different occasions. These mechanisms are not meant to be music-specific: all of them can be observed in other contexts. Finally, the mechanisms vary widely in terms of their evolutionary function, speed, availability to consciousness, and underlying neural activation patterns. The following sections contain brief summaries of the mechanisms of emotion elicitation by music posited by Juslin and Västfyll.

### **Brain stem reflex**

A ‘brain stem reflex’ occurs when one or more of the acoustic properties of the music are interpreted by the brain as signaling a potentially important and urgent event (Juslin & Västfyll, 2008, p. 6). Music (or even an isolated sound) that is sudden, loud or dissonant will, *ceteris paribus*, induce a negative affective response in the listener.<sup>12</sup> For example, the loud dissonant chords in Part 1, Scene 2 of Stravinsky’s *The Rite of Spring* might give rise to this type of response. The negative affect will typically be accompanied by physiological changes such as increased heart rate and activation of the sympathetic nervous system. For example, if I am sitting at my desk drinking a cup of tea and hear a sudden bang behind me, this mechanism would be activated, and I would be startled.

This mechanism operates relatively rapidly and appears to be culturally invariant. While the details of this mechanism’s neural underpinnings are not fully understood, there is evidence that responses to dissonance may recruit both paralimbic structures and auditory cortex, making the label ‘brain stem reflex’ somewhat inaccurate. The paralimbic structures seem to be involved with affective responses to dissonance (Blood et al., 1999; Koelsch et al., 2006), while the audi-

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<sup>12</sup> An alternative explanation of this mechanism given by Huron (2006) is simply that loud or sudden sounds are unexpected, and it is their unexpectedness that causes what he calls a negative ‘reaction response’.

tory cortex plays a role in the perceptual analysis of dissonance (Blood et al., 1999; Peretz et al., 2001). Consequently, lesions in auditory cortex will result in a deficit in dissonance perception without preventing its emotional processing, as seen in the case of patient IR (Peretz et al., 2001). By contrast, lesions in paralimbic regions result in indifference to dissonance despite its intact perception.

### **Evaluative conditioning**

Evaluative conditioning occurs when an emotion is elicited by a piece of music because the musical stimulus has regularly been paired with another positively or negatively valenced stimulus. Effectively, this situation is a case of classical conditioning where the conditioned stimulus is a piece of music. For example, I often listen to a particular piece of music while walking through my favorite park: over time, the music may become able to elicit happiness even in the absence of the park. Conditioning can occur without any conscious awareness of the repeated juxtaposition of the stimuli (Martin et al., 1984). Since we regularly encounter musical stimuli in situations where music listening is not the focus of our activity (e.g., in elevators or shops), Juslin and Vastfyll hypothesize that evaluative conditioning could be a relatively common elicitation mechanism.<sup>13</sup>

### **Emotional contagion**

Emotional contagion occurs when a listener perceives a piece of music to be expressing an emotion and ‘mimics’ the expressed emotion. This mimicking has been regularly observed in cases involving emotionally charged speech, also known as affective prosody (Kallinen & Rajava,

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<sup>13</sup> For a more detailed examination of background music’s influence on emotions in a retail environment, see Bruner (1990).

2006). Juslin and Vastfyll hypothesize that the perceived expressiveness of music stems partly from featuring sound patterns similar to those found in affective prosody. For example, when we are sad the tempo, pitch and volume of our speech typically decrease: thus, music that also possesses these properties (e.g., Barber's *Adagio in G Minor*) might activate this mechanism. In a similar vein, Juslin (1991) argues for the existence of a neural 'module' that responds automatically to these speech-like features, causing us to mimic the perceived emotion. Koelsch et al. (2006) provide neurological evidence that broadly supports the existence of such a mimicking mechanism; for a contrary viewpoint see Simpson, Oliver and Frigaszy (2008). While the empirical evidence in support of this mechanism is comparatively weak, nothing significant hangs on its existence—I have included it primarily for the sake of completeness.

### **Visual imagery**

Hearing a piece of music may cause a listener to imagine a mental image (e.g., of a scenic landscape): this mental image may in turn elicit an emotional response. For example, I might respond with happiness to an imagined vista of rolling fields, just as I would in reality. While this type of elicitation may seem odd (why should music prompt these feats of visual imagination?), the evidence for such a mechanism is compelling. For example, the use of visual imagery for emotion elicitation plays a vital role in many forms of music therapy such as the Guided Imagery and Music method developed by Bonny (2002). Visual imagery is an unusual mechanism due to the relatively high degree of control that the listener has over the process: I can in most cases strongly influence what kind of imagery, if any, a piece of music stirs up in my mind. It should be noted that Konecni and other MEE critics are skeptical about the capacity of music to elicit visual imagery, however nothing hangs on the existence of this specific elicitation mechanism.

## Episodic memory

Hearing a piece of music may evoke a memory of a specific event in a listener's life: this memory may then elicit a whole range of emotions through a process of association.<sup>14</sup> For example, hearing the theme tune to 'University Challenge' reminds me of a very positive experience, and that memory makes me happy and rather nostalgic.<sup>15</sup> This process of memory elicitation through music has become known as the 'Darling, they are playing our tune' phenomenon (Davies, 1978). Some associations are widely shared: for example, hearing 'Happy Birthday' might prompt many people to think of a childhood birthday party. The associations can be more idiosyncratic, as in the case of hearing a song that reminds me of a favorite book. Janata, Tomic and Rakowski (2007) provide strong empirical evidence for this mechanism.

At this point we might wonder why MEE would be at all surprising or controversial if we already accept that music can elicit episodic memories. The MEE skeptic's response would be to appeal to DID. They would accept that episodic memories are evoked by music, and that these memories can elicit emotions: nevertheless, they would claim that this mechanism involves *indirect* elicitation, and that consequently we cannot count any elicited emotion as an example of MEE. In other words, they claim that it is the *memory*, not the music, that is really doing the causal work in such cases. I will present my arguments against DID in Section 2.3.

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<sup>14</sup> The mechanism that enables me to recall autobiographical events is known as episodic memory.

<sup>15</sup> 'University Challenge' is a British quiz show.

## **Musical expectancy**

When we listen to music, we constantly form expectations about how the music will progress. We may have expectations about what will happen next (e.g., chord progressions) and when it will happen (e.g., on what beat in the bar a particular transition will occur). These expectations vary in strength, and we can have several competing sets of expectations at once. For example, if I hear an E followed by an F#, I will expect the next note to be G#. <sup>16</sup> If the next note is a G rather than a G#, my expectations will be violated and I will feel surprised or even distressed. Meyer (1956) highlighted the importance of musical expectancy for emotion elicitation, and studies such as Steinbeis et al. (2006) have found evidence in support of Meyer's theory using self-reports and physiological measures of emotion in response to unexpected musical events. <sup>17</sup> Huron (2006) has developed the theoretical underpinnings of musical expectancy as well as collecting a much wider range of supporting evidence: Huron's ITPRA theory will be discussed in more detail later in this chapter.

## **Cognitive Appraisal**

Occasionally a piece of music is relevant to my current goals, plans or well-being: when I appraise the music as being relevant in this way, I may feel an emotion. For example, if I'm trying to get to sleep and my neighbors are playing very loud music, the music prevents me from achieving my goal of getting to sleep. Consequently, the music may make me feel angry or sad. In this type of case the music could easily be replaced with another stimulus: for example, my

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<sup>16</sup> This assumes that I'm minimally familiar with Western musical styles: if my musical experiences were largely confined to a culture that uses different scales I would form different expectations.

<sup>17</sup> For a more detailed discussion of the role that physiological evidence plays in identifying emotions, see Section 3.3.

neighbors talking loudly or moving furniture around would elicit the same emotional response, since that too would stop me getting to sleep. According to Juslin and Vastfyll, this elicitation mechanism is relatively rare, since music is not typically goal-relevant in this way.

### **2.3 The power of expectation – Huron’s ‘ITPRA’ theory**

David Huron (2006) provides a comprehensive and empirically well-grounded theory of musical expectation. In doing so, he develops a more general theory of expectation that he calls ITPRA. ITPRA stands for ‘Imagination, Tension, Prediction, Reaction, Appraisal’. Huron argues that some, but by no means all, musically elicited emotions can be explained in terms of musical expectation. In the following section I will briefly describe the five components of ITPRA and highlight how Huron’s theory might supplement the framework suggested by Juslin and Vastfyll (2008).

Huron argues that the psychological phenomenon of expectation, and the emotional responses that often accompany it, is the cumulative result of five distinct underlying processes, each with different evolutionary origins, neural underpinnings and time courses. The Imagination and Tension processes can be understood as ‘pre-outcome’: they take place prior to the occurrence of the expected stimulus. By contrast, the Prediction, Reaction and Appraisal processes are ‘post-outcome’ responses to the accuracy of our expectations. All of these processes have some degree of valence, though these valences can vary independently.

#### **Imagination**

Humans often try to predict the future. For example, we try to predict how a person will behave, how an object will move, or what the weather will be like this afternoon. In such cases we may



imagine a variety of possible outcomes and select one as being most likely, thereby forming an expectation. Sometimes these expectations are conscious and highly deliberative, such as when I'm trying to predict how my committee will respond to a particular example in my thesis. By contrast, other expectations are largely unconscious and automatic, such as when I predict the future motion of a ball in flight in order to catch it.

According to Huron, our expectations about the course of a piece of music are largely of the latter kind; he describes them as 'automatic, ubiquitous and (mostly) unconscious' (Huron, 2006, p. 358). Forming accurate expectations is evolutionarily adaptive; correctly predicting the future improves perception and facilitates rapid and effective motor responses.<sup>18</sup> Accurate expectations enable us to tailor our actions to facilitate our long-term goals: if I can anticipate future events, I can plan much more effectively. Huron marshals a wealth of empirical evidence to argue that our minds form expectations about stimuli even when said stimuli are relatively unimportant for survival, as tends to be the case with music.

These expectations pack significant affective punch; when I imagine a positive future event such as defending my thesis, I feel an anticipatory sense of happiness that motivates me to pursue this goal (Loewenstein & Lerner, 2003). Damasio (1994) provides evidence for the importance of these anticipatory emotions. He describes a condition in which patients no longer experience the feelings associated with possible future outcomes. For example, Damasio's patient 'Elliot' was capable of feeling emotion in response to an experienced event and could accurately predict the likely outcomes of his actions, yet was unable to 'preview' the emotions that would accompany future positive or negative outcomes. The rather startling consequence of El-

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<sup>18</sup> Humans perceive a stimulus more rapidly and accurately when it is expected rather than surprising.

liot's condition was that he consistently failed to take action to avoid negative outcomes, because they had lost their motivational force. As Huron puts it, 'we do not simply think about future possibilities; we feel future possibilities' (Huron, 2006, p. 9).

### **Tension**

Once we have formed an expectation about the future, we attempt to prepare for the expected event(s). This preparation can generate a tension response. For example, if I see a friend standing in front of me with a balloon in one hand, a pin in the other and a mischievous grin on her face, I will form an expectation that she's about to pop the balloon. In response to this expectation I will shut my eyes, cover my ears and turn my face away. In such cases I have a strong expectation about *what* will happen, but a degree of uncertainty about *when* it will happen. By contrast, if I am a fielder in a cricket game, as the bowler begins his run-up I will tense my muscles, my heart rate and blood pressure will increase and my breathing will deepen.<sup>19</sup> In such a scenario I am relatively sure about the timing of future events, but am very uncertain about *what* will happen. This type of physiological and motor preparation consumes significant amounts of energy, which is why a fielder in cricket or baseball might be exhausted at the end of a match even if she has not been required to move at all. Huron argues that these fluctuations in physiological arousal can in turn generate or influence affective responses.<sup>20</sup>

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<sup>19</sup> Regular cricket-watchers may be skeptical of such claims; readers should feel free to substitute a sport that requires greater athleticism.

<sup>20</sup> By making this claim Huron seems to be endorsing some variant of a James-Lange theory of emotions (i.e., a theory according to which physiological changes can cause affective responses). For the purposes of this thesis, nothing hangs on whether he is correct on this point.

## **Prediction**

Forming accurate expectations about the future is typically beneficial to an organism, while faulty expectations are typically harmful. Consequently, it would seem adaptive for there to be some psychological weal or woe that occurs in response to the accuracy of these expectations. For example, I may expect that it will rain tomorrow when I'm hoping to play tennis. In the event that it does actually rain, my sadness at being unable to play tennis will be tinged with satisfaction at having correctly anticipated the miserable weather. This affective response to the accuracy of my expectations is what Huron dubs the Prediction response. When my expectations prove accurate, the prediction response is positively valenced and vice versa. Huron regards this aspect of the expectation process as particularly crucial and under-recognized. To take a musical example, when I correctly anticipate the course of a piece of music, the ensuing prediction response will be positive. This positive affect is often *misattributed* to the music (i.e., I believe it's the music itself that has generated the affect rather than the successful prediction).

## **Reaction**

In addition to responding to the accuracy of our prior expectations, once an outcome is known we can react affectively to the outcome itself. For example, I might experience fear when I encounter an angry dog, happiness when meeting an old friend, etc.. Huron draws on the work of LeDoux (1998) and others to argue that there are two distinct processes underlying these emotional reactions. The first of these involves a 'quick and dirty' assessment of the significance of an outcome, while the second is a more thoughtful appraisal. Huron labels these the 'Reaction' and 'Appraisal' responses. These responses can elicit contrasting emotions. For example, if I enter a surprise birthday party, then I may initially feel a sense of shock or fear upon encountering

this large group of people unexpectedly (the ‘reaction’ response), followed by happiness or joy once I realize that the people are my friends (the ‘appraisal’ response).

According to Huron, the reaction response exhibits three central features that distinguish it from the appraisal response. Firstly, the reaction response is fast, typically beginning ~150ms after the event, though physiological changes such as increased heart rate may persist for some time. Secondly, it is not mediated by consciousness: as cases of blindfright show, I can exhibit fear responses to a stimulus that I do not consciously perceive.<sup>21</sup> Lastly, it is defensive or protective in function, in the sense that it assumes a worst-case scenario and responds accordingly. A reflex is an example of a reaction response in a non-emotional context: when I touch a hot stove my hand is immediately withdrawn, and this is controlled via a reflex arc that excludes the brain. This reflex exhibits all three of the features indicated by Huron.

On the other hand, not all reaction responses are reflexes, as some are learnt rather than instinctive. For example, consider a sentence incorrect that grammatically is. Upon reading such a sentence, we will tend to feel a sense of surprise: this surprise is a reaction response in Huron’s sense, yet it results from the unexpected violation of a learned schema, namely the rules of English grammar. In the case of music, over time we form schemas at various levels of detail that are roughly analogous to the vocabulary and grammar of a language (Huron, 2006, p. 92). When these schemas are violated, it provokes a negative reaction response.

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<sup>21</sup> In cases of ‘blindfright’, subjects are shown an image of a typically fear-causing stimulus (e.g., a spider), but the image is masked (i.e., shown very briefly) so that the subject has no conscious awareness of seeing the image (cf. Scarantino 2010). Despite this lack of conscious awareness of the stimulus, subjects exhibit physiological and neurological responses (e.g., increased skin conductance, startle reflexes and differential amygdala activation) that are strongly indicative of fear.

## **Appraisal**

Following the reaction response, we may diminish, augment or revise our initial response to an event through a process of conscious reflection upon its significance. For example, in the case of the surprise party mentioned above, my feeling of fear would be supplanted by happiness as I assess the situation and realize that I am surrounded by friends. This slower and more deliberative affective response is what Huron calls the Appraisal response. By contrast with the reaction response, appraisals are relatively slow, mediated by consciousness and typically arrive at a more accurate assessment of an event's significance, rather than being 'defensive' like the reaction response.<sup>22</sup>

## **Reconciling Huron with Juslin and Vastfyall**

Having outlined Huron's ITPRA theory, we might wonder how it relates to the 7-part theory advocated by Juslin and Vastfyall (2008). Should they be understood as competing theories, as complementary components of a larger theory, or as completely independent? It seems clear that, at the very least, they are not competitors: while Juslin and Vastfyall are attempting to provide a comprehensive theoretical framework for understanding the mechanisms underlying musically elicited emotions, Huron makes no such claim. Indeed, Huron explicitly notes that 'music can also evoke emotions through many other means—apart from whether sounds are expected or not' (Huron, 2006, p. 365).

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<sup>22</sup> It is important to note that Huron's use of 'appraisal' differs from the usage of the term by emotion theorists. For example, Huron's appraisals are always conscious, whereas this is not necessarily the case according to emotion theorists.

Perhaps the most helpful way to understand the connection between the two theories outlined above is as complementary components of a broader theory of MEE. More specifically, Juslin and Vastfyll provide a wide-ranging survey of the mechanisms that may underpin MEE, while Huron goes into greater depth regarding one of those mechanisms, namely expectancy. Juslin and Vastfyll certainly seem favorably disposed towards Huron's ITPRA theory, stating that it is 'interesting, original and laudable' (Juslin & Vastfyll, 2008, p. 604). Their sole worry is that Huron might be trying to fit too much under the heading of musical expectancy, but this concern seems relatively minor. Consequently, when using these theoretical resources to address *a priori* critiques of MEE I will treat them as being largely consistent with one another.

The main conclusion I will use these theories to support is that no clear or useful distinction can be drawn between 'direct' and 'indirect' elicitation mechanisms. Indeed, Huron and Juslin and Vastfyll both seem to reject any such distinction (Juslin & Vastfyll, 2008, p. 605). Thus, it is to DID that I shall now turn.

#### **2.4 But where are the appraisals? – Konecni's *a priori* critiques**

In the previous sections of this chapter I outlined two prominent theoretical frameworks for understanding the mechanisms that underlie MEE. I will now use these frameworks to support my critiques of DID. My focus will be on Konecni (2003, 2008a, 2008b), as he provides the most detailed and persuasive formulation of this distinction.

Konecni (2003, 2008a, 2008b, 2009) holds that music does not directly elicit emotions. Instead, he argues that music can elicit emotions only through non-musical intermediaries such as memory associations and visual imagery. For example, Konecni (2008b) argues that 'if these nonmusical mediators...were to be kept constant, there would be no effect of music on emotion'

(p. 583). Similarly, Konecni (2008a) maintains that ‘for music to produce emotions, its effects must be cognitively mediated by memories and associations regarding powerful real-world events’ (p. 123). Without these mediators, Konecni thinks that only moods and quasi-emotions such as ‘frisson’ can be elicited by music.<sup>23</sup> He draws a distinction between direct and indirect mechanisms and holds that only indirect mechanisms can elicit genuine emotions.

Konecni’s opposition to ‘direct’ elicitation of emotion by music is based on the claim that directly elicited MEE lack an essential feature of emotions, namely a cognitive appraisal.<sup>24</sup> For example, when I am afraid, Konecni holds that I must have formed a judgment or appraisal that the object of my fear is in some way threatening: without such an appraisal, I am not really feeling fear. This emphasis on the necessity of appraisals is the defining feature of cognitivist theories of emotion. Konecni clearly states that he endorses such a theory, saying that ‘major, perhaps dominant, emotion theories emphasize appraisal’ (Konecni, 2008b, p. 582). While describing cognitivist theories as ‘dominant’ might be contentious, Konecni also conflates ‘cognitivist theories of emotion’ with ‘scientific theories of emotion’ (Konecni, 2003, p. 334). By doing this, Konecni suggests that while MEE might exist given a ‘folk’ conception of the emotions, a robustly scientific understanding of the emotions would rule them out.

This labeling of non-cognitivist theories of emotion as unscientific is controversial: cognitivism is by no means the only viable theory of emotion in the contemporary literature, and thus Konecni cannot simply take its truth for granted. Of course, if cognitivism turns out to be true

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<sup>23</sup> Frisson can be roughly characterized as positive subjective affect accompanied by piloerection (also known as goosebumps).

<sup>24</sup> Konecni accepts that such appraisals might very occasionally be present (e.g., when loud music is preventing me from sleeping), but argues that in such cases the appraisal is what is doing the causal work, thus making the elicitation ‘indirect’.

then it may pose a problem for some types of MEE, but as Konecni himself correctly notes, ‘one must, of course, be careful not to rule out the possibility of a phenomenon or relationship by definitional fiat’ (Konecni, 2003, p. 332). Indeed, it would seem viable to argue that MEE provide a possible counter-example to cognitivist theories of emotion given the wealth of empirical evidence supporting their categorization as emotions.<sup>25</sup> A summary of this empirical evidence is provided in the next chapter. For now, I will critically examine Konecni’s foremost tool for arguing against MEE, namely DID.

### **The Direct/Indirect Distinction [DID]**

Konecni’s distinction between ‘direct’ and ‘indirect’ elicitation mechanisms is problematic for a number of reasons. I argue that DID lacks empirical support and is used by MEE skeptics in a manner that is question-begging. On the empirical side, it is important to note first of all that neither of the leading accounts of MEE discussed in this thesis utilize DID, nor does it seem they could be made to accommodate it. Indeed, Juslin and Vastfyll (2008) specifically reject Konecni’s use of DID, arguing that ‘this distinction does not make sense in the current framework (and probably not in any other framework either)’ (p. 605). They note that all emotion elicitation mechanisms involve some information processing, and thus might be considered ‘indirect’, depending on how we cache out DID. In other words, the notion of a ‘direct’ mechanism is under-specified by Konecni and thus could be fleshed out in a wide variety of ways. Since Konecni never provides a definition of what makes a mechanism ‘direct’, it is extremely hard to ascertain the criteria that underlie the distinction. We might attempt instead to infer the details of DID from the examples used by Konecni: for example, he holds that episodic memory associa-

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<sup>25</sup> See Section 4.3 for further details.



tions are a paradigmatic case of an indirect mechanism. By contrast, he thinks that Juslin and Vastfyll's 'brain stem reflex' would be a direct mechanism.

Given these examples, a charitable reading of DID might be explicated in terms of different types of information processing. For example, 'indirect' mechanisms might be those that are mediated by consciousness.<sup>26</sup> This reading does, at least, fit well with the examples mentioned above: for example, brain stem reflexes would count as direct due to their unconscious processing. Unfortunately, this more detailed definition runs into major difficulties. Given this definition, it's unclear whether musical expectancy would be considered 'direct' or 'indirect', as the degree of conscious accessibility and control varies widely depending on the set of expectations in question (see Section 2.2). Konecni tries to get around this possibility by declaring that 'there are no rational grounds' to hypothesize that musical expectancy can elicit emotions, but he provides no evidence for this claim (Konecni, 2008b, p. 583).

Juslin and Vastfyll's 'cognitive appraisal' mechanism seems to generate still further problems for DID thus construed: indeed, Konecni himself can be read as arguing that it is 'direct' and 'indirect' given this interpretation of DID. Konecni (2008a) holds that the cognitive appraisals required for emotion elicitation can be 'largely performed at an unconscious level' (p. 118): thus, they would be direct according to our charitable interpretation of DID. On the other hand, Konecni (2008b) and Kivy (1999) hold that cognitive appraisals are a clear example of an indirect mechanism. Thus, it seems that cognitive appraisals have the potential to be both direct and indirect: since the purpose of DID is to split elicitation mechanisms neatly into two camps, this seems to pose a serious problem for its proponents.

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<sup>26</sup> It's worth noting again that neither Konecni, Kivy nor Zangwill go into detail about how direct and indirect mechanisms are to be distinguished: presumably they consider it intuitively obvious.

While there may be some other interpretation of DID that avoids these issues, this seems a faint hope given that (1) none of its defenders provide such an interpretation and (2) theorists such as Juslin and Vastfyll strongly disavow that any such interpretation is possible within their framework. Overall, it seems that DID is at least empirically superfluous, since the mechanisms underpinning MEE can be explained and categorized within a range of well-regarded theoretical frameworks without positing any such distinction. Further, given the serious complications that arise when DID is given a more detailed articulation, it seems we are justified in going further and claiming that DID is empirically unwarranted.

Having made a case that DID is empirically unwarranted, I will further argue that it is question-begging. I argue that DID serves merely as a means to rule out evidence that is problematic for MEE skeptics. For example, DID allows them to declare that emotions elicited through memory associations aren't genuine MEE. What makes this move question-begging is the fact that there is no independent rationale for making such a distinction: its sole function is to rule out evidence that is damaging to the view of the MEE skeptics.

As will be shown in Chapter 3, the empirical evidence suggesting that cognitive appraisals and episodic memory can generate emotional responses to music is compelling and is acknowledged by MEE skeptics. Episodic memory in particular seems to be a relatively common elicitation mechanism (Juslin & Vastfyll, 2008). Consequently, a means of discounting these mechanisms is of vital importance if MEE skepticism is to be tenable. Doing so on the grounds that any emotions elicited via appraisals or memory aren't really MEE, or declaring them 'bizarre and idiosyncratic' (as Kivy does), serves exactly this function. Nevertheless, there seems to be scant independent motivation for such a move: the empirical case for DID has been shown to be deeply problematic, and none of the MEE skeptics provide any alternative justification for its intro-

duction. Thus, the MEE skeptics defend their position by appeal to a distinction that functions solely as a way of ruling out evidence that harms their position. Consequently, DID is being used in a question-begging manner.

In this section I have attempted to show that DID is highly problematic on both empirical and theoretical grounds. As a result, the use of DID by MEE skeptics is called into question. More concretely, if DID is rejected then defenders of MEE can once again appeal to episodic memory associations, cognitive appraisals and so forth as mechanisms that can elicit MEE. Given the wealth of empirical evidence supporting the existence of these mechanisms (which will be surveyed in Chapter 3), the flaws of DID significantly strengthen the case for MEE. In the next sections of this chapter I will address the remaining *a priori* arguments made by MEE skeptics, focusing on those offered by Kivy and Zangwill.

## **2.5 The idiosyncrasy of associations – Kivy’s *a priori* critiques**

Kivy (1989, 1999) argues that music cannot elicit emotions: when people say that music makes them feel happy or sad, they are simply mistaken. In other words, Kivy has an ‘error theory’ regarding MEE. He argues that music has the power to move us, but that being moved is not the same thing as having an MEE. An example of ‘being moved’ in Kivy’s sense would be being awed by the complexity of a passage or stunned by the novelty of a chord progression. While both awe and being stunned are emotions, Kivy’s claim is that such emotions are being elicited by *complexity* or *novelty*, rather than by the music itself, and thus do not qualify as MEE. This claim seems to be underpinned by a variant of DID, and as such is problematic for the reasons outlined in the previous section.

According to Kivy, we consciously appraise the music as having certain properties and respond with an aesthetic judgment, though Kivy never gives a definition of such judgments or explains how they differ from emotions. Kivy has four arguments for his error theory: two are best understood as *a priori* while the others are *a posteriori*. In this chapter I will address his *a priori* arguments.

Kivy offers two *a priori* arguments against MEE. The first of these rests on the idea that particular emotions such as fear are typically caused by certain kinds of beliefs. For example, Kivy would argue that fear of an object or event is caused by the belief that it is threatening. Kivy argues that music ‘provides no opportunities, except in bizarre and idiosyncratic ways...for the formation of such beliefs’ (Kivy, 1989, p. 156). Consequently, Kivy holds that whatever is being elicited by music cannot be an emotion, since it lacks this supposedly essential feature. For example, when we say music makes us feel sad we do not believe that the music has caused us to suffer a loss, which would be required given Kivy’s theory of emotions. We can standardize Kivy’s argument as follows, leaving aside the ‘bizarre and idiosyncratic’ proviso for now:<sup>27</sup>

- (1) Emotions are always caused by certain kinds of beliefs.
- (2) Music cannot cause the relevant kinds of beliefs in humans.

Therefore,

- (3) Music cannot elicit emotions.

The flaw in Kivy’s argument lies in premise (1): if we interpret ‘belief’ as requiring some degree of conscious access, as Kivy seems to do, then the premise is false, since phenomena such

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<sup>27</sup> The ‘bizarre and idiosyncratic’ proviso is intended primarily to apply to cases involving what Juslin & Västfyll would call ‘cognitive appraisal’. An example of this type of appraisal would be when my neighbors’ playing loud music prevents me from sleeping. Kivy views any emotions elicited as being not caused by the music *qua* music, and thus not qualifying as MEE.

as ‘blindfright’ strongly suggest that emotions can be elicited in the absence of any relevant beliefs.<sup>28</sup> At the same time, we can accept that emotions are often caused by certain kinds of beliefs, or that such beliefs are a common component of emotions. This would simply mean that MEE are unusual insofar as they do not involve such beliefs. Since there appear to be clear counter-examples to (1), Kivy’s argument is in danger of collapsing.

Kivy might respond by suggesting that cases such as blindfright can still be accommodated by (1) so long as we are willing to extend the notion of ‘belief’ to include subconscious responses to masked stimuli. Kivy could claim that the subjects in blindfright experiments do have a belief that an image (e.g., of a spider) is threatening, but the belief is completely subconscious and unreportable.<sup>29</sup> The defender of MEE might reply that if we are willing to posit subconscious beliefs in the case of blindfright, we could also posit such beliefs in the case of MEE, thus putting pressure on premise (2). Since such unconscious beliefs are (by definition) unreportable, it is unclear how Kivy could rule them out.

Nevertheless, it seems there is a viable line of defense open to Kivy: he could argue that spiders and snakes are dangerous to humans, and consequently images of them are capable of activating a ‘quick and dirty’ fear elicitation mechanism using subconscious beliefs (LeDoux, 1998). By contrast, music is simply not the type of thing that could elicit these kinds of subconscious beliefs, since music is not dangerous and thus not automatically perceived as threatening.

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<sup>28</sup> For a definition of ‘blindfright’, see footnote on page 14. Further evidence for the existence of emotion in the absence of conscious beliefs is provided by Winkielman & Berridge (2004).

<sup>29</sup> We might worry at this point that the notion of an ‘unconscious belief’ is somehow contradictory or conceptually confused. While this worry seems reasonable, we can perhaps sidestep it by substituting the word ‘judgment’ or ‘appraisal’ for ‘belief’: I assume here that Kivy would be willing to adjust his terminology. With this proviso, I shall continue to use the term ‘belief’ for simplicity’s sake.

The defender of MEE might reply to this move in two ways: firstly, she might note that certain acoustic phenomena such as dissonance and rapid amplitude increases are in fact quickly and automatically perceived as threatening. For example, Juslin and Vastfyll's 'brain stem reflex' mechanism seems capable of eliciting negative emotional responses, including physiological and behavioral responses typical of fear. Furthermore, it seems possible that, due to the largely subcortical underpinnings of this process, auditory masking could in theory be used to elicit these emotional responses without any conscious awareness of the stimulus.<sup>30</sup> If this were the case, then Kivy's premise (2) would be falsified even if he tried to extend 'belief' to include subconscious processes.

Secondly, and perhaps more decisively, the defender of MEE could note that avoiding cases such as blindfright by extending 'belief' in this way would be a prime example of what Scarantino (2010) calls 'The Elastic Strategy'. This strategy involves stretching the meaning of 'belief' (or 'judgment' or 'appraisal') in an *ad hoc* manner to accommodate problem cases such as blindfright. Scarantino argues that this strategy is ultimately unfruitful, as it renders the overarching theory at worst unfalsifiable and at best trivially true (Scarantino, 2010, p. 742). If Kivy is willing to extend the term 'belief' in an unprincipled manner simply to address problem cases, then his theory of emotions ceases to be informative, and furthermore it's hard to see how it could ever be falsified. Thus, it seems Kivy cannot simply adjust the boundaries of 'belief' in order to save premise (1): as a result, his first *a priori* argument becomes unpersuasive.

To lay the groundwork for his second *a priori* argument against MEE, Kivy asserts that 'the only really plausible account' of MEE involves them being generated solely through individual

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<sup>30</sup> To my knowledge this prediction has not been tested empirically, so it would seem to offer an interesting avenue for future research.

memory associations (Kivy, 1989, p. 157).<sup>31</sup> For example, I could hear a song that makes me think of a loved one who has passed away; this memory could then lead to a strong feeling of nostalgia. Kivy holds that emotions generated in this way ‘are irrelevant to the real expressive character of the music and are the result of personal associations: what I above called the bizarre and idiosyncratic’ (*ibid.*). When music evokes a memory that in turn elicits an emotion, Kivy argues it would be misleading to call this emotion a MEE, since the elicitation depends on idiosyncratic associations. We might standardize Kivy’s argument as follows:

(1) The only really plausible account of MEE posits a single elicitation mechanism, namely memory associations.

(2) Memory associations are bizarre and idiosyncratic.

(3) Bizarre and idiosyncratic mechanisms cannot generate genuine MEE.

Therefore,

(4) Genuine MEE do not exist.

While Kivy delivers this argument elegantly, its flaws are readily apparent. Both (1) and (2) are straightforwardly false, and the distinction between ‘bizarre and idiosyncratic’ and normal mechanisms seems dubious at best. We might start by noting that (1) flies in the face of the extensive theoretical literature surrounding MEE. There are many accounts of MEE that posit multiple mechanisms: two of these accounts have already been discussed in some detail at the start of this chapter. Both theories highlighted in this thesis were published more recently than Kivy (1999), but there are many others that were widely known at the time, such as Meyer (1961).

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<sup>31</sup> Kivy doesn’t pick out any particular author’s account of MEE in mind when he says this.

Consequently, it seems that either Kivy ignored the many theories of MEE that posit mechanisms other than memory associations, or else he considered all such theories not to be ‘really plausible’. The former possibility would indicate a worrying disregard for debates in more empirically oriented fields, while the latter would be a bold claim in need of strong supporting arguments that Kivy does not provide. In either case, it seems we would have good reason to reject Kivy’s claim in (1).

Furthermore, (2) seems to be a very hasty generalization: while some (perhaps most) memory associations are deeply personal and might reasonably be classed as idiosyncratic, others are much more widely shared. For example, hearing ‘God Save the Queen’ makes me think of my time living in England, and thinking of England typically makes me feel proud. I suspect that similar associations could be found in many of my compatriots. It seems highly implausible to call such widespread associations ‘idiosyncratic’ or ‘bizarre’. Moreover, even when the memory tokens in question are unique, it is probable that patterns can be observed in the memory types that a piece will tend to evoke. For example, there is some evidence that Chopin’s Prelude in E Minor tends to evoke a preponderance of nostalgic memories, particularly those relating to loved ones (Zander, 2008). Of course, the causal story here is potentially complicated: perhaps some pieces elicit emotions that dispose us to recall certain types of memories, rather than vice versa. Such questions might be resolved through detailed empirical investigations of the type surveyed in the next chapter. At the very least, it seems Kivy’s premise (2) is overly simplistic.

Finally, (3) relies on a distinction between normal elicitation mechanisms and those that are ‘bizarre or idiosyncratic’. This distinction is motivated by the idea that emotions elicited via ‘bizarre or idiosyncratic’ mechanisms are not really elicited by the music at all. Instead, the emotions are being elicited by intermediate mental states such as memories or cognitive appraisals.



Thus, Kivy can accept that these ‘bizarre or idiosyncratic’ mechanisms lead to emotion elicitation while denying the existence of MEE. Kivy’s distinction is almost perfectly analogous to Konecni and Zangwill’s distinction between ‘direct’ and ‘indirect’ mechanisms: they too place memory associations and cognitive appraisals into a special category that can’t give rise to MEE. My arguments against DID were outlined in the previous section: I hold that DID is both empirically unsupported and question-begging. If my arguments are sound, then (3) is seriously called into doubt, and Kivy’s second *a priori* argument collapses even more completely.

## 2.6 The paradox of sadness – Zangwill’s *a priori* critiques

Zangwill (2007) offers three *a priori* arguments against MEE. His first argument is that ‘There seems to be something paradoxical about the fact we enjoy music that we describe in terms of “negative” emotions, such as grief, melancholy, or despair’ (Zangwill, 2007, p. 397). The paradox is as follows: if sad music really does make us feel sad, and feeling sad is unpleasant or otherwise undesirable, why would we listen to it? Zangwill argues that listening to music that elicits negative emotions would be a ‘masochist’s pastime’ (*ibid.*). Since we are not, for the most part, masochists, this seems paradoxical. If Zangwill were correct about the existence of this paradox, it would suggest that instrumental music could not elicit genuine sadness, nostalgia, etc.. While this issue would not be a full-fledged refutation of the existence of MEE, it would certainly constitute a significant error on the part of folk psychology.

There is a wide range of viable responses to Zangwill’s supposed paradox; I will outline three. Firstly, we might note that contextual factors can play an important role in music choice. For example, if I am already in a relatively bleak mood it will affect my music choices; I will tend to listen to pieces that match my mood. Music listening does not occur in a vacuum, so my

desire to listen to music that makes me sad may be intelligible only once we take into account my pre-existing mental states (Tamir, 2009). In such cases, Zangwill's paradox is dissolved by noting that we sometimes want to feel sad. Music that typically elicits happiness would simply be unappealing or even aggravating in such contexts (Tamir, 2009).

Secondly, phenomena such as 'limbic contrast' can give rise to a greater hedonic payoff when satisfying moments in a piece are preceded by passages that make us uncomfortable or sad (Huron, 2006, p. 22).<sup>32</sup> Temporary feelings of sadness or uncertainty can play a vital role in augmenting the overall impact of a piece, leading to a more positive affective response overall. This pattern of bleak or depressing moments followed by a positive or satisfying finale can be found in a wide variety of art forms (Huron, 2006). In such cases Zangwill's paradox is dissolved because the music saddens us as a means to a more positively valenced end.

Thirdly, the elicitation of negatively valenced emotions is integral to art forms such as classical Greek tragedy (Schaper, 1968). Consequently, we might make a 'partners in crime' reply to Zangwill's dilemma: if it's problematic that we listen to music that makes us sad, the problem applies equally to Greek tragedies, as well as sadness-inducing films, novels, etc.. Of course, this response does not dissolve the paradox, and it would still be helpful to have a positive account of what role negative emotions play in our experience of tragedies, horror movies and so forth. Nevertheless, it is clear that music is not unique in this respect: since Zangwill's paradox applies to all sorts of art forms, it does not bite particularly hard as a critique of MEE. Between these three replies, it seems the defender of MEE has adequate resources with which to address Zangwill's paradox.

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<sup>32</sup> Limbic contrast occurs when a negative affective response is followed by a positive response, leading to an augmentation of the overall positive affect. For example, a consonant chord is typically reported as being more pleasant when it is preceded by a dissonant passage.

Zangwill's second argument against MEE involves the by now familiar appeal to cognitivist assumptions about emotion. Zangwill argues that affective responses to music cannot be genuine emotions because 'the essential normative constraints on such emotions are lacking. For example, if we are really angry, we should believe or at least entertain the thought that someone has wronged us' (Zangwill, 2007, p. 398). Here, Zangwill is making a cognitivist assumption, namely that emotions must be caused or accompanied by certain types of beliefs. He then declares without argument that this is an 'essential normative constraint' on what counts as an emotion. As explained previously (see Sections 2.3 and 2.4), this move is highly problematic. Furthermore, Zangwill assumes a fairly naive form of cognitivism that deals with conscious beliefs rather than judgments or appraisals. I have already addressed Kivy and Konecni's versions of this argument: cognitivism is not the only viable theory of emotions within the contemporary literature, and as such cannot be assumed for the purposes of ruling out MEE. My response to Zangwill is essentially the same and will stand or fall accordingly.

### 3. Surveying the Empirical Landscape

In the previous chapter I outlined and evaluated all of the major *a priori* arguments against MEE. I concluded that none of the *a priori* arguments on offer are successful, though they were certainly strong enough to merit a detailed response, which has been lacking in the literature to date. Having cleared the ground for MEE, I present a positive empirical case for their existence in the first three sections of this chapter. My contention is that whichever major theory of emotions we support, the evidence in favor of MEE should prove fairly compelling.<sup>33</sup>

I will then go on address the *a posteriori* critiques of the MEE skeptics, with a particular focus on Konecni's methodological critiques. The overall goal of this chapter is thus to secure the case for the existence of MEE: once that has been achieved, I will spend Chapter 4 examining the implications of this defense. For now, I will turn to the most prevalent method of data collection concerning MEE, namely self-reports.

#### 3.1 How does this music make you feel? – Self-reports of musical emotions

The most widely utilized data source when studying MEE is the self-report.<sup>34</sup> A simplistic example of self-report collection might be as follows: subjects are asked to sit and listen to a selection of classical music, and at regular intervals are asked either to write down freely any emotional responses they are having, or to rate their emotional responses using a scale or checklist.

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<sup>33</sup> See Section 2.1 for a brief outline of numerous contemporary theories of emotion, as well as a summary of the type of evidence that each might find persuasive.

<sup>34</sup> In this context a self-report is a subject's verbal or written report of their own emotional experience (or lack thereof).

The central finding of the vast majority of self-report studies is that subjects consistently report feeling a wide range of emotions in response to instrumental music. Self-reports of MEE have been shown to be commonplace both in the laboratory and in more ecologically valid environments such as music festivals (Zentner et al., 2008). These results have been consistent using ‘continuous measure’ techniques to monitor emotional change as a piece progresses (Schubert, 2007) as well as long-term surveying techniques such as ‘experience sampling’ (Sloboda et al., 2001).<sup>35</sup>

Thus, even in the absence of other evidence there seems to be a strong *prima facie* case that instrumental music elicits emotions: it would be rather surprising if so many people were systematically wrong about whether they were experiencing emotions! Of course, this response does not mean that everyone feels emotions in response to instrumental music, nor that any possible emotion can be elicited by such music, nor that context is irrelevant to the elicitation process. Furthermore, there are numerous methodological issues raised by relying solely on self-reports, some of which will be discussed in the following sections.

### **Conflating expression and elicitation**

Despite the ubiquity of self-reports in the literature, there are numerous drawbacks to their use. Firstly, listeners sometimes conflate the emotions they take a piece of music to be expressing with their own emotional reaction to the piece of music. Zentner et al. (2000) vividly highlight this effect, finding a significant drop in the frequency of self-reports of emotions when subjects were asked expressly to distinguish their own emotional reaction from the music’s perceived ex-

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<sup>35</sup> Experience sampling involves subjects being prompted at random intervals during the day to report if they are listening to music and, if so, whether it is eliciting an emotion.

pressiveness. Furthermore, Gabrielsson (2002) points out that researchers themselves have on occasion conflated emotion perception with emotion elicitation, leading to further confusion. On the other hand, even when this distinction is clearly made, roughly 55%-65% of listeners still self-report emotions being elicited (Juslin & Laukka, 2004). Overall, such concerns don't fully undermine the usefulness of self-reports; they merely suggest that a note of caution is required when drawing strong inferences from them.

### **Presentation biases and labeling errors**

There are several further psychological factors that would seem to render self-report studies in general problematic. Firstly, the demands made by experimenters may make a positive result more likely. For example, being asked 'what emotions (if any) did you feel in response to the piece?' may hint at the hypothesis under examination, leading subjects to 'comply' by referring to mild affective responses or moods as emotions. Secondly, subjects may believe that feeling emotions in response to instrumental music shows emotional depth or cultural sophistication, and consequently inflate their responses. Equally, the reverse could be true, with subjects seeing such emotional responses as 'weak' or inappropriate: in either case, these biases would systematically skew the results.

Lastly, subjects may have difficulty in verbalizing their emotional state, even if we grant them perfect introspective access to such states, which is itself a controversial assumption. Consequently, their self-reports may be inaccurate or inconsistent due to labeling errors. This type of difficulty can be further exacerbated by a 'closed response' format where subjects have to choose from a limited set of options. For example, if music makes me feel nostalgic but I have to rate

my emotional responses solely on scales of ‘happy’ and ‘sad’, the results may not be an accurate representation of my MEE.

Overall, it seems that while self-report methodologies do have significant practical advantages, namely low cost and minimal apparatus requirements, any conclusions drawn solely from such data should be treated as highly tentative. Interestingly, MEE skeptics often rely on self-reports in isolation: for example, Konecni (2008a) criticizes the methodology of many MEE studies yet still bases his positive conclusions solely on self-reports.

Nevertheless, it seems that if we want to draw a firm conclusion about the existence of MEE, we will need to complement self-reports with more varied data sources. For example, neither a James-Lange theorist nor a ‘basic emotions’ theorist would find self-report data wholly persuasive as evidence of emotion elicitation. This is because self-reports are intended to capture the feeling component of an emotion, and neither James-Lange theories nor basic emotion theories rely heavily on such feelings as evidence of emotion elicitation (see Section 2.1 for details). Until recently, there was a significant dearth of alternatives to self-reports, but over the last decade there has been a proliferation of studies investigating emotions and music using physiological and neurological measures; it is to this body of literature that I will turn next.

### **3.2 Your brain on music – Neurological evidence for musical emotions**

Given the problems with self-reports, further evidence in favor of MEE is required to make the empirical case persuasive. One source of such evidence comes from neurological studies of MEE: these examine patterns of brain activation while subjects are listening to music, looking for activation patterns that are characteristic of emotional responses. While the major theories of

emotion vary in terms of the role they give to the neurological component of emotion, most of them would acknowledge that neurological data have some evidentiary weight.

Compared to the number of studies relying solely on self-reports, there are relatively few studies that have examined the neurological basis of affective responses to music. This dearth is understandable given the relative novelty of the key investigative tools (e.g., PET, fMRI), but even in its brief history this line of research has produced several noteworthy findings. Rather than providing a whistle-stop tour of the literature, I will focus in detail on a landmark study by Blood and Zatorre (2001).<sup>36</sup> I focus on this study both because their results are fascinating and because their methodology is notable for avoiding many potential pitfalls.<sup>37</sup>

Blood and Zatorre (2001) investigated the neural and physiological correlates of the affective response variously known as ‘chills’, ‘shivers’ or ‘frisson’ (henceforth ‘frisson’). I avoid the term ‘emotion’ here in order to avoid begging the question, though I would tentatively suggest that musically-induced frisson does deserve to be considered an emotion, albeit one that is non-prototypical.

Blood and Zatorre’s subjects each chose a piece of music that they claimed consistently induced positive emotional responses in them. Interestingly, all of the subjects chose instrumental music (specifically Western classical music). Furthermore, all subjects reported that the music did not have any strong associations or memories attached to it: thus, *prima facie* it seems that the music was having its effects without any need for associative links. When listening to their pieces of music, subjects reported experiencing high levels of frisson in 77% of cases and also

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<sup>36</sup> See Koelsch (2010) for such an overview.

<sup>37</sup> This will prove significant when responding to Konecni (2008a) later in the chapter.



reported very high levels of emotional intensity; they did not experience chills when control pieces, random (amplitude-matched) noise or silence were played. Physiological measures such as heart rate, breathing depth and skin conductance showed a strong positive correlation with self-reported frisson. In other words, the subjects' heart rates and skin conductance increased and their breathing deepened when they claimed to be undergoing frisson.

The more ground-breaking aspect of the study involved measuring regional cerebral blood flow (rCBF) increases during frisson using a positron emission tomography (PET) scanner.<sup>38</sup> Regression analysis assessing the relationship between frisson intensity rating and PET measurements of rCBF showed an increase in activity in left ventral striatum and dorsomedial midbrain, as well as a decrease in activity in the left amygdala and ventromedial prefrontal cortex (VMPF). These patterns of activation remained even when the control music was removed from the regression analysis and in the subtraction analysis, suggesting that these brain structures are active specifically as part of frisson rather than due to differences in attention, familiarity, etc..

Blood and Zatorre note that 'the pattern of activity observed here in correlation with music-induced chills is similar to that observed in other brain imaging studies of euphoria and/or pleasant emotion' (p. 4). More specifically, they note that a similar pattern of activity is found when we examine the neural correlates of humans enjoying food, sex and drugs such as cocaine. By contrast, the activation pattern is very different to that observed in affective responses to dissonance (Blood et al., 1999). This result suggests that distinct neural mechanisms underpin frisson and affective responses to dissonance, which fits neatly with Juslin and Vastfyll's theoretical claim that multiple mechanisms can produce MEE.

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<sup>38</sup> Increased blood flow can most straightforwardly be understood as a rough proxy for neural activity, though it's an imperfect measure as the temporal and spatial resolution of PET is rather limited.

Blood and Zatorre conclude that instrumental music can recruit neural systems of reward and emotion similar to those known to respond to biologically relevant stimuli such as food and sex (as well as being artificially activated by certain drugs). Furthermore, this elicitation can occur without any previous conditioning or strong memory associations. This lack of associative cues is significant, as it suggests that the elicitation is ‘direct’ in Konecni’s sense: thus, even if we were to accept DID, despite its highly problematic features, it seems there would still be substantial neurological evidence for MEE. I will turn next to the physiological evidence in favor of MEE: this source of data is particularly relevant for persuading James-Lange theorists and ‘basic emotions’ theorists to accept the existence of MEE.

### **3.3 Thrills and chills of sound – Physiological evidence for musical emotions**

A James-Lange theorist argues that ‘we are sad because we cry’: more generally, they hold that physiological changes are the causal drivers of emotional responses. In this section, I will show that the physiological data strongly support the existence of MEE. Emotions typically have a wide range of physiological effects or components: for example, when I am angry, my heart rate, breathing patterns and skin conductance will all change. Although it is not yet possible to identify a specific emotion solely on the basis of a physiological ‘signature’, it is widely accepted that physiological evidence can support the hypothesis that an emotion is being elicited. By contrast, moods tend not to involve such pronounced physiological reactions (Frijda, 1994). In this section I will survey the physiological evidence in favor of MEE. In addition, I will discuss EMG data showing that instrumental music can induce facial expressions strongly indicative of emotion (i.e., music makes people smile, frown, etc.).

A major paper in this area is Krumhansl (1997), who demonstrated that the physiological changes in subjects experiencing self-reported happiness, sadness and fear in response to music were very similar to the physiological changes observed when happiness, sadness and fear were elicited in non-musical contexts. While aspects of Krumhansl's methodology have been called into question by a number of later researchers, her findings were corroborated by Nylicek, Thayer and Van Doornen (1997).<sup>39</sup> Rickard (2004) took this line of research further and showed that self-reported intensity of the MEE correlates strongly with the magnitude of the physiological changes observed. While other studies have produced more mixed results, the preponderance of physiological data support the existence of MEE. As noted above, these data would prove particularly useful in convincing a James-Lange theorist to accept the existence of MEE.

Another major source of physiological evidence for MEE comes from electromyography (EMG) studies: for example, Witvliet and Vrana (1996) showed the presence of corrugator muscle<sup>40</sup> activity during music consistently judged to be negatively valenced, as well as zygomatic muscle<sup>41</sup> activity during positively valenced excerpts. Furthermore, studies such as Gabrielsson (1991), Waterman (1996) and Sloboda (1991) have demonstrated that 'sad' instrumental music can consistently cause bouts of crying even in a laboratory setting. It seems clear that instrumental music can cause facial expressions and behavior that are prototypical evidence of the presence of particular emotions. On the basis of these facial expression data it seems a 'basic emotions' theorist such as Ekman would have good reason to accept the existence of MEE.

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<sup>39</sup> See Section 3.5 for details of some criticisms of Krumhansl's methodology.

<sup>40</sup> The 'corrugator' muscle (corrugator supercilii) is a facial muscle involved in frowning.

<sup>41</sup> The 'zygomatic' muscle (zygomaticus major) is a facial muscle involved in produced genuine smiles, also known as 'Duchenne' smiles.

It should be noted at this stage that the foregoing empirical evidence would carry less weight with certain groups of emotion theorists. For example, a cognitivist could argue that without evidence of the appropriate judgments, we cannot conclude that an emotion has been elicited. Nevertheless, it would be a hardline cognitivist indeed who denied that the physiological and neurological evidence outlined above is suggestive of the existence of MEE. There are undoubtedly deeper theoretical issues about how we should formulate, adjust or limit our theories of emotion in light of empirical evidence, but these lie outside the scope of this thesis.

My goal in these sections was to provide an empirical case for MEE that would prove persuasive to as wide a range of emotion theorists as possible. At the very least, I would argue that on the basis of the existing data James-Lange and ‘basic emotions’ theorists both have good reason to accept MEE. Having provided this empirical case, I will outline and evaluate the major *a posteriori* critiques offered by the MEE skeptics.

### **3.4 Crying in front of the stereo – Kivy’s *a posteriori* critiques**

In Chapter 2 I addressed Kivy’s *a priori* arguments against MEE: I will now respond to his two *a posteriori* arguments. Kivy’s first *a posteriori* argument is intended to highlight a component of ‘regular’ emotions that he claims is absent in supposed cases of MEE (Kivy, 1989, p. 155). More specifically, Kivy notes that emotions are associated with ‘modes of behavior’: for example, when I am angry I lash out. He goes on to claim that ‘no such consistent behavioral manifestations are observed in the concert hall or...in front of the hi-fi’ (*ibid.*). The argument can be standardized as follows:

(1) Emotions are typically associated with certain behavioral dispositions (e.g., I cry when I am sad).

(2) No such behavioral dispositions are typically associated with our affective responses to music.

Therefore,

(3) Our affective responses to music are not emotions.

There are two major flaws in this argument. Premise (2) makes an empirical claim that is simply false: behavioral manifestations of emotion such as crying in response to sad music have been reliably shown in a variety of settings, including laboratories and concert halls (Gabrielson, 2001; Sloboda et al., 2001).<sup>42</sup> Secondly, Kivy's argument underestimates audience effects as a factor that might heavily influence behavioral manifestations of MEE.<sup>43</sup> While he does acknowledge the possibility of appeals to audience effects, he dismisses them as 'ad hoc...attempts to defend a bankrupt theory' (Kivy, 1989, p. 156). Kivy provides no evidence to back up this bold claim. As Kivy himself notes, many forms of behavioral expression would be strongly frowned upon in the context of a classical concert: as a result, we cannot infer the absence of MEE from the absence of particular behavioral manifestations. We might also note that in other listening contexts (e.g., a mosh pit at a rock concert) behaviors typically associated with anger are very much the norm. Thus, once we take into account the relevant empirical data along with well-documented psychological phenomena such as audience effects, this *a posteriori* argument against MEE seems unpersuasive.

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<sup>42</sup> We might wonder whether crying should be considered a behavioral or physiological response: I have stuck with it since it is one of Kivy's chosen examples.

<sup>43</sup> An 'audience effect' is the impact that an audience (whether real or imagined) has on a subject's performance of a task. In the case of MEE, audience effects might inhibit or promote certain behavioral responses depending on context.

Kivy's second *a posteriori* argument (p. 160) is significantly weaker, but I will address it briefly for the sake of completeness. It runs as follows:

(1) Some people [specifically, Kivy and some of his acquaintances] never self-report cases of MEE.

Therefore,

(2) The self-report data as a whole neither support nor weaken the case for MEE.

Therefore,

(3) The empirical case in favor of MEE is unpersuasive.

In this argument, Kivy makes two significant errors: firstly, in premise (2) he portrays the self-report data as evenly split between those who claim to have emotions elicited by music and those who don't, and he makes this claim solely on the basis of anecdotal evidence (p. 160). By contrast, the data from self-reports overall strongly support MEE (Sloboda & Juslin, 2001). The fact that Kivy and some of his acquaintances happen to self-report differently doesn't bring these data into question!

Secondly, by moving from (2) to (3) Kivy assumes that the case in favor of MEE rests squarely on the self-report data. As has been demonstrated in this chapter, Kivy's assumption is manifestly false.<sup>44</sup> The case for MEE can be made much stronger through appeal to neurological and physiological data in addition to self-reports. Consequently, even if Kivy were right that the self-report data were ambiguous with respect to MEE, this fact would not suffice to secure his *a posteriori* argument against MEE. In the next section, I will outline and evaluate *a posteriori* arguments against MEE made by Konecni (2008a).

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<sup>44</sup> On the other hand, this assumption of the importance of self-report data makes more sense if we accept Kivy's claim that there are no other behavioral manifestations of MEE.

### 3.5 Controlling biases – Konecni's *a posteriori* critiques

Vladimir Konecni (2003, 2008) provides a clear and detailed set of critiques of MEE. His arguments successfully highlight some important methodological pitfalls into which researchers have on occasion fallen. Nevertheless, I will argue that Konecni's *a posteriori* critiques are insufficient to undermine the case for MEE: at most, they call into question some oft-cited studies such as Krumhansl (1997). While these are significant achievements, Konecni overstates the implications of his critiques, particularly once we take into account more recent research that clearly avoids the issues he raises.

The essence of Konecni's position is as follows: 'the body of research that purports to support [MEE] is recent and unconvincing. The actual number of relevant studies is quite small.' (Konecni, 2008, p. 115) Konecni argues that the superstructure of research into MEE is built on limited and shaky foundations. For example, he argues that researchers often fail to properly distinguish between moods and emotions, or pay lip service to such a distinction but go on to draw conclusions that ignore its implications. Furthermore, Konecni alleges that the distinction between music expressing an emotion and music eliciting an emotion is often glossed over, with studies dealing with the former being treated as support for the latter.

Konecni explains these failures by suggesting that folk-psychological support for MEE has biased researchers towards seeing support for MEE where none exists. In short, Konecni holds that 'with regard to [MEE], romanticism and sentimentalism often obscure both the facts and their absence even in highly technical papers' (Konecni, 2008, p. 115). Overall, we could express Konecni's *a posteriori* argument as follows:

(1) The amount of empirical research directly supporting MEE is much smaller than is commonly supposed by its advocates.

(2) Many of the studies that do support MEE are undermined by methodological and interpretative issues.

Therefore,

(3) Asserting the existence of MEE is unwarranted given the available data.

I argue that both premises of Konecni's argument are false, though he does raise some important issues that need to be taken on board by proponents of MEE. Konecni's position is flawed because he overstates the extent of the problems within the empirical literature on MEE. Nevertheless, the absence of detailed replies to Konecni's position within the literature is surprising given the credible arguments and supporting evidence that he offers.

While Konecni's claims are undoubtedly bold, he makes a strong effort to support and defend them. Through the use of small-scale surveys Konecni sought empirical backing for his psychological claims about the failings of researchers and subjects. While several of these experiments proved unfruitful, two in particular stand out as providing important critiques of influential papers within the MEE literature. The first of these focused on Sloboda and Lehman (2001), a paper that deals with perceived emotional expressiveness of music rather than MEE. Konecni shows that a significant proportion of students and psychology professors who read key sections from the paper interpreted it as supporting the existence of MEE, when in fact the paper was ostensibly silent on that question.

Konecni attributes this miscomprehension to two main factors: firstly, he argues that Sloboda and Lehman use ambiguous language when describing the 'emotionality' of music. Conse-



quently, a reader could easily misunderstand the meaning of the paper.<sup>45</sup> Secondly, Konecni asserts that readers' pre-existing belief in MEE led them to misinterpret the study as supporting this belief (i.e., they displayed confirmation bias).<sup>46</sup> Thus, Konecni holds that a combination of authorial sloppiness and reader bias led to the misinterpretation.

In response to Konecni's survey, a defender of MEE might note that while a communication error did occur amongst a significant portion of the individuals surveyed, the majority correctly understood that Sloboda and Lehman's paper had nothing to say about MEE. Thus, even in this particular case it seems the issues Konecni raises were restricted to a minority of readers. Furthermore, Konecni insinuates that this type of communication error in favor of MEE is widespread within the literature, but he fails to back up this statement (Konecni, 2008a, p. 119). Thus, we might reasonably reply that Konecni is giving in to selection bias, making generalizations about the whole MEE literature on the basis of a few ambiguous passages from a single study.<sup>47</sup>

While the issues Konecni raises are indeed pitfalls that researchers must be careful to avoid, it seems he picked Sloboda and Lehman (2001) because he believed it to be a particularly clear case of the flaws that he alleges to be more widely present. Furthermore, Konecni selected specific passages from the paper rather than getting participants to read the paper in its entirety. Given this small and carefully pruned selection, it does not seem possible to draw conclusions about the wider literature with any degree of confidence.

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<sup>45</sup> For example, a reader might conclude that Sloboda and Lehman provide evidence for MEE, whereas in fact they are concerned solely with our judgments of music's expressiveness.

<sup>46</sup> Confirmation bias is a typically unconscious cognitive bias in which people tend to process new information in a manner that supports or confirms their existing beliefs.

<sup>47</sup> Selection bias occurs when biased or unrepresentative samples are used as the basis for empirical generalizations.

Konecni's second *a posteriori* criticism of the MEE literature is an experiment in which he replicates one of the classic MEE studies with a few minor methodological alterations and ends up with significantly different results. The study in question is Krumhansl (1997), which was an investigation of MEE using self-reports and physiological data. Konecni repeated the experiment at UCSD, but changed the introductory section of the participants' instructions slightly. While in Krumhansl's study the participants read that 'Music is thought to have many effects on people, including influencing their emotions', in Konecni's study they read that 'Researchers disagree on whether or not music has an effect on emotion'. With only this seemingly superficial change, the average self-reported sadness in response to the pieces (both of which were intended to elicit sadness) decreased significantly. Konecni argues that his results undermine Krumhansl's study, which is one of the most-cited studies within the MEE literature.

We might agree with Konecni that his study highlights an important methodological issue with Krumhansl's study, namely that the instructions given to participants betrayed the experimenter's preferred hypothesis, thereby affecting their responses. Nevertheless, Konecni's attempts to draw wider conclusions from this finding are much less persuasive. First, we might note that even with Konecni's changes, subjects reported a relatively high level of emotional response to the music. Several other methodological alterations made by Konecni in parallel experiments had no effect on the results whatsoever. Consequently, while Krumhansl's results might be less conclusive than previously thought, they are by no means invalidated.

Furthermore, while Krumhansl's study is often cited within the literature, these citations are often due to its role as a groundbreaking early study of MEE, not as an up-to-date source of data. Other authors have critiqued aspects of Krumhansl's methodology, and for the most part these critiques have been taken on board by contemporary studies (Juslin & Sloboda, 2010, p. 198).

Consequently, even if Krumhansl's results were completely demolished, this demolition would not serve to undermine the empirical support for MEE. Given the sheer volume of studies that have sprung up since Krumhansl's pioneering work, Konecni has to do much more if he wishes to call the existence of MEE into doubt through *a posteriori* arguments.

Overall, we must acknowledge that both premises of Konecni's *a posteriori* argument against MEE do highlight ways in which individual researchers have erred in terms of both methodology and data presentation. Nevertheless, as claims about the MEE literature more generally they both become relatively unpersuasive: Konecni consistently fails to show that these problems are as widespread as he claims, and we have no independent reason to suppose this to be the case. Consequently, it seems we are justified in rejecting Konecni's arguments along with Kivy's: the case for MEE seems secure against these *a posteriori* critiques.

Thus far the goals of this thesis have been to defend MEE against a range of critiques and to construct a positive empirical case for their existence. I have endeavored to provide data that would prove persuasive to a wide range of theorists, thereby sidestepping some of the fundamental disagreements that persist within the field of emotion theory. In the fourth and final chapter of this thesis, I will draw out the implications of the existence of MEE for various fields of study: I will focus particularly on the consequences for emotion theory on both a theoretical and experimental level.

## **4. Drawing out the implications**

### **4.1 A limited defense of folk psychology**

Folk psychology strongly affirms that MEE exist: for example, numerous large-scale surveys and experience sampling studies have indicated that people regularly report experiencing MEE (Zentner et al., 2008; Sloboda et al., 2001). MEE skeptics largely accept that MEE are posited by folk psychology, though Kivy and Konecni both note that the frequency of self-reports decreases when people distinguish expressed emotions from elicited emotions. The MEE skeptics' concern is that researchers are insufficiently critical of this folk-psychological shibboleth.

By addressing the major arguments advanced by Kivy, Konecni and Zangwill against MEE, I have tried to defend the folk psychological position against its critics. I have argued that belief in MEE is warranted. This claim is significant, as the non-existence of MEE would constitute a prime example of the fallibility of folk psychology. Indeed, while the arguments of the skeptics are strong enough to be worth addressing, they are often much too quick to declare MEE eliminated and folk psychology mistaken. In a similar vein, theorists such as Konecni often disparage non-cognitivist accounts of emotion as mere 'folk theory', as if that by itself rendered a position implausible: I have endeavored to correct this anti-folk bias where possible.

### **4.2 Affective responses and artistic merit**

While this thesis is concerned with an aesthetic phenomenon, namely music, it does not directly take a stance on any major debates within aesthetics. Nevertheless, one might wonder (with Zangwill) whether aesthetic formalism would be threatened by the existence of MEE, but this

worry would be misplaced.<sup>48</sup> Aesthetic formalists can straightforwardly accommodate MEE by accepting their existence but denying their relevance to aesthetic evaluations of music. On the other hand, Kivy (1989) uses the non-existence of MEE as a premise in his arguments against various positions within aesthetics (Kivy, 1989, p. 169). If this thesis has been successful, then Kivy's premise will be undermined: his arguments will require new foundations.

### **4.3 Eliciting emotions in the laboratory**

This thesis has several implications for the scientific study of MEE. First, investigations into MEE can proceed with more assurance now that the existence of the phenomenon in question has been more thoroughly established. For example, there will be less need for the regular disclaimers in MEE articles that take pains to acknowledge the skepticism of authors such as Kivy and Konecni (Juslin and Vastfjall, 2008, p. 560).

In addition to its positive contribution, this thesis highlights several methodological pitfalls into which MEE researchers have on occasion fallen, most notably the conflation of music expressing and eliciting an emotion. For example, the instructions given to subjects in MEE studies might not fully distinguish between judging a piece of music to be sad and actually feeling sad in response to the piece of music. Many of these methodological issues were forcefully raised by Konecni, and his warnings are important to bear in mind, though he significantly overstates the impact these issues have on the empirical support for MEE.

Finally, this thesis notes several areas where the empirical evidence in favor of MEE could benefit from further development, as well as areas in which further investigation would increase

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<sup>48</sup> An aesthetic formalist holds that a work's artistic value is entirely determined by its form. For example, a formalist would say that the emotions elicited by a work are irrelevant to appraising its artistic merit.

our understanding of the mechanisms underlying MEE. For example, there is a dearth of ecologically valid studies that examine specific elicitation mechanisms. Indeed, the investigation of specific elicitation mechanisms will undoubtedly constitute a major challenge for future research. For example, isolating the impact of musical expectancy requires a great deal of foresight and methodological caution, though I would argue that Huron (2006) provides an excellent model for such investigations.

While isolating particular mechanisms is undeniably challenging, doing so would provide a means of more rigorously testing the predictions made by the theoretical frameworks discussed in Chapter 2. Of course, further difficulties arise from the fact that no single framework has yet achieved pre-eminence: as a result there is little consensus on what frameworks to test or how to test them, particularly given the underlying disagreement about what precisely constitutes emotions and how to determine their presence. Nevertheless, such challenges are to be expected in a relatively young field.

#### **4.4 Concerns for cognitivists**

This thesis has implications for the wider study of emotions on both a practical and theoretical level. On a practical level, once MEE are sufficiently well understood that they can be reliably elicited, they could provide a powerful new tool for researchers seeking to elicit emotions such as happiness and sadness in laboratory conditions (Koelsch, 2006). This tool would be particularly useful in the case of positive emotions such as happiness, since such emotions are notoriously difficult to elicit for experimental purposes (Koelsch, 2010, p. 131). Even MEE skeptics such as Konecni recognize that this tool would be a significant aid to emotions researchers, though they disagree about the potential for MEE to fulfill this function (Konecni, 2009, p. 705). A further

practical application of MEE is in the prevention of anti-social behavior in public places: for example, since 2008 classical music has been used on the London Underground to calm commuters and criminals alike.

The theoretical impact of this thesis primarily concerns cognitivist theories of emotion. The existence of MEE suggests the existence of non-linguistic and possibly primitive emotion elicitation mechanisms that any satisfactory theory of emotions should be able to account for. Thus, it seems that any cognitivist theory of emotions that aspires to universality (e.g., Solomon, 2004) would have to find some way of accommodating these elicitation mechanisms within their theory. It is extremely hard to imagine how such theories could do so without relying on the Elastic Strategy (see Section 3.3). While a full elaboration of this point lies outside the scope of this thesis, it seems *prima facie* plausible that the existence of MEE could pose a serious problem for cognitivist theories of emotion.

#### **4.5 What's next? The future of musical emotion research**

In this thesis I have defended the view that MEE exist. This defense has involved a survey of the relevant empirical data in favor of MEE, an outline of two major theories explaining MEE, and responses to the arguments of MEE's staunchest critics. I have also briefly discussed the significance of MEE in a range of fields. While the scope of this thesis is modest, it engages comprehensively and in detail with the arguments of MEE skeptics, whereas most authors to date have responded only incompletely or in passing. As Konecni (2003) puts it, the MEE literature to date 'understates the skepticism many researchers have regarding music and real emotions' (p. 333).

The pay-off of my approach is that we can gain a more detailed appreciation of the concerns driving the MEE skeptics, and thereby extract some notable insights from their critiques as

well as clearly setting out their flaws. It is my hope that this thesis will set future investigations of MEE on a firmer footing, as well as suggesting possible avenues of further philosophical research, particularly with respect to potential conflicts between MEE and cognitivism. To conclude, MEE remain complex and imperfectly understood phenomena, yet it seems folk psychology is right: instrumental music really does have the power to elicit emotions.



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