

Musical Contagion

Subjects: [Philosophy](#) | [Music](#) | [Psychology](#)

Contributor: Federico Lauria

Music can contaminate us. Sometimes, listeners perceive music as expressing some emotion (say, sadness), and this elicits the same emotion in them (they feel sad). What is musical contagion? This entry presents the main theories of musical contagion that crystallize around the challenge to the leading theory of emotions as experiences of values. How and why does music contaminate us? Does musical contagion elicit garden variety emotions, such as sadness, joy, and anxiety? Does music contaminate us by simply moving us? Which role does imagination play in our affective responses to music? Is musical arousal elicited by automatic mimicry? What does musical contagion teach us about emotions? Musical contagion addresses fundamental theoretical and practical issues.

emotion

music

musical emotions

contagion

mood

being moved

sad music

emotion regulation

appraisal theory

expressiveness

Music has strong emotional powers. There are various mechanisms through which music induces emotions. Sometimes, listeners perceive music as expressing some emotion and this elicits the same emotion in them. Perceiving a requiem as sad may fill you with sadness. Perceiving Looney Tunes theme music as happy may make you feel happy. Horror music may trigger anxiety, and so on. Just like other people may infect us with their emotions (for instance, a friend's anxious tone of voice may make one feel anxious), music can induce emotions via contagion. In contagion the emotion felt mirrors the emotion perceived in music: listeners feel the same emotion as the emotion they perceive in music.

Importantly, contagion is not limited to music with lyrics (e.g., songs) nor to programmatic music. It also happens with absolute or pure music, i.e., non-representational music. It is in this case that the phenomenon is the most perplexing. In the case of songs, for instance, lyrics often portray emotions or situations, like fictions or narratives do. Consider how many sad songs are about heartache and separation. Such lyrics readily explain why we perceive sad songs as expressive of sadness, and why this may make us feel sad. Heartaches and separation, for instance, are unfortunate and tragic things. But the case of pure music is different. How can *pure* sound be, say, expressive of sadness and make us feel sad? Why would *pure* music—just sounds—make us feel sad, happy, or anxious? How and why can pure music contaminate us?

Musical contagion is central to our appreciation of music and to the value of music. It also plays a chief role in emotion regulation with music and hence in our therapeutic, educational, and political uses of music. What is musical contagion? Which role does it play for well-being and health? What does it teach us about emotion? This entry presents the main theories of contagion from an interdisciplinary perspective. Contagion is a philosophical riddle for it does not square well with standard and widely accepted features of emotions. What is worse, it threatens the leading theory of emotion, according to which emotions are experiences of values or involve cognitive evaluations (cognitivism). Section 1 presents cognitivism, whereas section 2 articulates the musical challenge to cognitivism. Sections 3-5 present various ways to discard the challenge to cognitivism that appeal to moods, being moved, and imagination, respectively. By contrast, sections 6-7 offer an overview of the ways scholars have embraced the challenge and conceived of musical contagion in terms of primitive feelings or primitive contagion, respectively.

1. Cognitivism

What are emotions? Emotions involve various features such as bodily feelings, physiological changes, facial expressions, and action tendencies. Yet, according to the dominant theory of emotion in philosophy and empirical disciplines, emotions essentially are representations or cognitions of values, such as threats, losses, bad news, good news, injustice, beauty, cuteness, the comic, the sublime, etc. Call this conception “cognitivism” (the view is also sometimes called “evaluativism” [11,78,79,80,81,82]). Consider—like in Hitchcock’s *The Birds*—that Melanie is afraid of ravens flying in her direction. Her heartbeat accelerates. Her breath becomes short. She trembles. She screams and runs away. Yet fundamentally, she is afraid because she evaluates the ravens as a threat to her survival. Likewise, feeling sad about a separation is experiencing this event as unfortunate.

According to cognitivism, the intentional structure of emotions is twofold. First, emotions have intentional objects or content: Melanie’s fear is about ravens. Second, emotions involve evaluations of their object or content: the ravens are evaluated as threatening. Cognitivism offers an elegant way of specifying emotional objects or content: the object or content of some emotion is the situation evaluated. Melanie is afraid of ravens because she evaluates the ravens as threatening. Cognitive evaluations can be wrong. Melanie might be afraid of a harmless bird. In that case, the emotion is inappropriate. Cognitivism nicely explains that. Arguably, cognitive evaluations capture the other facets of emotions as well: facial expressions, physiological changes, and action tendencies are adaptive responses to representations of values.

Cognitivism’s main competitor is the bodily feelings view à la William James [83], or at least, the pure bodily feeling view according to which emotions are bodily feelings that do not involve evaluation [84]. The core claim of cognitivism is compatible with some bodily feelings views and some motivational views of emotion, as long as they concede that emotions involve evaluations [85,86]. Cognitivism also contrasts with the recent emphasis put on valence and arousal as core features of emotions, as in conceptual act theory [87]. In this view, affect fundamentally involves valence and arousal; specific emotions result from conceptualizations of the feelings on behalf of the subject in the absence of cognitive evaluations. More generally, non-cognitivism claims that emotions do not involve evaluation. Maybe they do not have intentional objects [88]. Even if they do have intentional objects, this is not explained by cognitive evaluations, as there are not any.

There are different variants of cognitivism. Following the Stoics, Nussbaum argues that emotions are evaluative judgments [89]; this is the doxastic variant of cognitivism. By contrast, most scholars conceive of emotion as (analogous to) perception of values [78,81,82,85,90,91], while others argue that emotions are *sui generis* evaluative attitudes [79,80,92]. The debate about contagion is typically formulated to target the doxastic variant but it extends to all cognitivist views, such as the perceptual or attitudinal variants. Cognitivism is also at the heart of appraisal theory, the leading theory of emotions in psychology [93,94,95]. According to appraisal theory, emotions are elicited and differentiated by various appraisal checks of situations in light of one’s goals, such as novelty, goal relevance, goal congruence, coping potential, etc. In neuroscience, conceiving the amygdala as a “relevance detector” encoding value is a declination of the same thought [96,97,98].

Cognitivism does justice to the role of emotions in our life. As experiences of values, emotions are an integral dimension of morality, social life, and well-being. Emotions may even justify evaluative judgments and constitute evaluative knowledge or understanding [11,99,100]. Renouncing cognitivism comes at a cost.

I 2. The Musical Challenge to Cognitivism

Music induces emotions through various mechanisms, such as idiosyncratic associations, memories, expectations, imagery, and cognitive appraisal. Cognitivism is compatible with many of

these mechanisms. It can account for feeling scared by a loud scream, being surprised by an interval, becoming sad as the music evokes bad memories, being happy while imagining a magic forest, and feeling delighted because the music perfectly suits the activity one is engaged in. These emotions are about the music and involve an evaluation of the music, or of something the music brings about (such as imaginings or memories of past events). These emotions are no philosophical riddles. The trouble is contagion [70,101].

Imagine that you hear Samuel Barber's Adagio for Strings, Op. 11 for the first time. Listening to the music you perceive it as sad, and contagion happens: you feel sad. According to cognitivism, your sadness consists in evaluating the music as unfortunate or as bad news. The theory claims that sadness is experiencing a situation or object as unfortunate/as bad news. For cognitivists, emotions are induced by the appraisal of situations in light of one's practical goals. However, this seems wrong when it comes to musical contagion. In listening to the Adagio for Strings, Op. 11, you do not evaluate the music as unfortunate, suffering, or in any negative manner. Nothing bad happened. When listeners are infected by music, they do not appraise the music in light of their practical goals: in the case at hand, music is irrelevant to practical goals [32]. Of course, music is sometimes relevant to our practical goals. One may feel proud of one's daughter's recital, admire a drummer's performance, or feel disgusted by neo-Nazi music. In these cases, the emotion felt is unproblematic because it involves an evaluation of the music in light of practical goals, such as personal, artistic, or political concerns. The problematic case also differs from emotions felt because of some idiosyncratic association between the music and some personal event, like when music fills one with sadness because it reminds one of awful times. In the relevant example, music does not remind you of some unfortunate event: you hear it for the first time. Since the music is not appraised as relevant to one's practical goals, it cannot be the object of the emotion felt. How is it possible that musical contagion induces affective states in listeners then?

As contagion does not involve the evaluation of the music in light of practical goals, it is a counter-example to cognitivism. Call this the Musical Challenge. The challenge is not restricted to sad music, and it extends to all instances of musical contagion. Happy music infects you, yet there is no good news. Music makes you anxious, yet the music is harmless. Angry music makes you feel rage, but no injustice happened. There is simply nothing to be sad, happy, anxious, or angry about. The music is irrelevant to the assessment of the fate of our practical goals.

The Musical Challenge consists of two related yet distinct challenges.

The Object Challenge: Emotions have intentional objects. Yet the emotions elicited by contagion are not about the music.

The Value Challenge: Emotions involve evaluations of their objects. Yet contagion does not involve evaluation of the music.

Because the object of some emotion is the object evaluated, the Object Challenge depends on the Value Challenge. You are not sad about the music because you do not appraise the music as unfortunate. At least this is so on the cognitivist construal of emotional content or object. It would thus appear that the Value Challenge is more fundamental.

Things are more complex, however, and philosophers have not paid sufficient attention to the relation between these two challenges. For instance, proponents of non-cognitivism are not committed to the claim that the content or object of some emotion is the situation evaluated. For they deny that emotions involve evaluations. Yet, thinking of emotions as bodily feelings is compatible with emotions having intentional objects. The object of the emotion would be the object of the feeling. I put aside these details for now and will come back to them when discussing the main solutions to the Musical Challenge in concreto.

Here is a rough formulation of the reductio of cognitivism.

(i) Contagion elicits garden-variety emotions (sadness, anxiety, joy, etc.).

(ii) Cognitivism: Emotions have intentional objects and involve evaluations of their objects.

(iii) Per (i) and (ii), emotions elicited by contagion are about the music and involve evaluation of the music.

(iv) Object Challenge: Emotions elicited by contagion are not about the music.

(v) Value Challenge: Emotions elicited by contagion do not involve the relevant evaluation of the music.

(C) Cognitivism does not capture contagion.

The Musical Challenge differs from the paradox of fiction or the question of why we feel emotions towards fictional characters that we do not believe to be existent. The Musical Challenge arises for absolute music and thus does not concern fiction or narratives. However, similar challenges apply to other non-figurative art forms (e.g., abstract paintings, architecture, abstract sculptures) and to physiognomic contagion. But let's focus on music.

What follows from the Musical Challenge? Strictly speaking, the conclusion is that cognitivism does not capture contagion ([Section 3.6](#) and [Section 3.7](#)). Most psychologists and neuroscientists embrace this conclusion [[9,63,102,103,104,105](#)]. According to the dominant neuroscientific approach, music contaminates us by the means of automatic mimicry or empathy in the absence of cognitive appraisal. This may involve mirror neurons firing, although this hypothesis has not been tested. Listeners' brains automatically mirror the musicians' movements used to communicate emotion [[106](#)], or simulate emotional motor structures [[24](#)]. Interestingly, happy music activates premotor regions involved in vocal sound production even when listeners are not singing [[107](#)].

Yet, the Musical Challenge invites one to draw wide-ranging conclusions about the nature of emotion. Scherer argues that cognitivism is true of "utilitarian" emotions as opposed to aesthetic emotions: the latter emotions are disinterested and do not involve appraisals in light of practical goals [[108](#)]. Robinson adopts a multi-componential view: emotions are complex processes that involve cognitive appraisal, non-cognitive responses, motor representations, and feelings [[109,110](#)]. Some emotions involve all processes, including cognitive appraisal, while other emotions—such as those elicited by contagion—do not. These conceptions are compatible with a grain of truth in cognitivism. But a more dramatic conclusion suggests itself. If cognitivism cannot capture contagion, cognitivism is false [[77,84](#)]. In fact, contagion offers support for non-cognitivism: contagion can be characterized as eliciting pure bodily feelings, just like emotions, in general, are on this conception.

Although philosophers have raised and rebutted objections to cognitivism (e.g., the case of recalcitrant emotions or the emotions towards fictional characters [[82,99,111,112](#)]), proponents of cognitivism in emotion theory have not addressed the case of music in detail. The main reactions to the challenge have been offered by philosophers of aesthetics before the affective revolution of the philosophy of mind. As the challenge is pressing, it is worth addressing it with the recent tools offered by emotion theory and affective science.

Cognitivists have two options: defuse or rebut the challenge. Defusing the challenge amounts to denying that there is a challenge in the first place. The challenge relies on premise (i): contagion elicits garden-variety emotions (e.g., sadness, happiness, anxiety, anger). This assumption has

been denied. Hence, the challenge vanishes ([Section 3.3](#) and [Section 3.4](#)). The second option for cognitivists is to rebut the challenge: contagion brings about ordinary emotions, yet the challenge fails as contagion does involve evaluation ([Section 3.5](#)). Let us examine each option.

3. Defusing the Challenge: Moods

The challenge assumes that contagion elicits proper emotions such as sadness and anxiety. One way to deny this assumption is to argue that contagion does not bring about bona fide emotions but moods ([101,113,114](#)).

Like emotions, moods are affective states. There is something it feels like to be in a gloomy, as opposed to a euphoric or irascible mood. Now, music undoubtedly can induce moods ([110,115](#)). Music is among the major mood inducers. This is why we often use music to regulate our moods. Conceiving of contagion as eliciting moods is thus plausible. If contagion prompts moods rather than emotions, the challenge does not arise: the challenge assumes that contagion results in emotion proper and its target is cognitivism about emotion. A widely agreed distinction between emotion and moods can substantiate this thought.

It is common to distinguish between emotions and moods by appealing to their intentional content or objects ([116](#)). Emotions have specific objects. Melanie is afraid of the ravens. By contrast, moods do not have intentional objects ([80,117](#)), or at least not specific intentional objects. Consider that you are in a depressed mood. Your mood is not about something in particular. If it is directed at something, it is about the world in general: the world seems dark, heavy, and depressing to you. By contrast, when we are in an elated mood, the world seems rosy, light, and wonderful. Although moods can be caused by specific events (for instance, the birth of a child), they are not about them. If any, moods have global content ([118,119](#)). After all, moods, unlike emotions, have a diffuse phenomenology; moods are free-floating ([120](#)).

If contagion elicits moods and if moods do not have specific objects, it follows that moods induced by music are not about the music. Although moods are elicited by the music, they are not directed at it, just like drugs elicit feelings without the feelings being about them ([121](#)). As a mood, the affect in contagion is a free-floating experience. Consequently, the Object Challenge does not arise. If the mood elicited by contagion is not about the music, the music is eo ipso not being evaluated. The Value Challenge is defused too. Or so the argument goes.

Let me start by raising an issue about this proposal that has played an important role in the dialectic of the debate and that concerns the Object Challenge. The question of the intentionality of moods is debated. While some scholars argue that moods do not have intentional objects at all, it is more common to think that moods simply do not have specific intentional objects ([116,118,119](#)). Moods are about the world in general. This implies that moods elicited by contagion are about the world in general. However, this seems implausible. When sad music makes one feel sad, one's sadness is not directed at the world in general. If anything, and as problematic as the idea is, the feeling induced by music seems to be directed at the music ([122](#)). For only this tight connection between emotion and music can explain the relevance of contagion for the aesthetic experience of music ([123](#)). Issues about intentional objects thus arise again: replacing emotions with moods deprives the feeling elicited by the music of an intentional object, or it delivers the wrong intentional object. Both options are problematic.

In reply, Robinson has argued that the moods elicited by music clearly are not directed at it ([101](#)). They are non-cognitive feelings that are merely induced by it. The standard intentionalist theory of moods simply does not apply to music. This reply, however, amounts to adopting non-cognitivism about contagion (in fact, Robinson's view is non-cognitivist, [Section 3.6](#)). The reply is thus unsatisfying if one aimed at using moods to rescue cognitivism.

Although the discussion has focused on the Object Challenge, an interesting future direction for research would be to investigate how this proposal handles the Value Challenge. In the recent surge of interest in the intentionality of moods, philosophers have emphasized how moods involve global or at least diffuse evaluations. For instance, Tappolet argues that moods represent evaluative possibilities: moods are about the likely instantiation of evaluative properties [116]. In an anxious mood, one experiences a threat as likely. Kriegel argues that moods represent the world as instantiating some evaluative property [120]. In a euphoric mood, the world is represented as wonderful; in a depressed mood, the world is represented as pointless, etc. Rossi argues that moods represent undetermined objects as instantiating a specific evaluative property. In an anxious mood, we experience something as threatening, although we cannot pick up what exactly [124]. Be that as it may, if moods involve evaluations of this kind, the Value Challenge strikes back again. Although listeners may not feel sad about the music, they still appraise the situation as instantiating a negative value, albeit in a diffuse way. But this is simply a new variant of the Value Challenge; this is the Value Challenge for musical moods. The burden of proof lies on the aficionados of the appeal to moods.

Although contagion can elicit moods, more needs to be said to neutralize the Musical Challenge. Let us consider a second way of defusing it.

| 4. Defusing the Challenge: Being Moved

For the Musical Challenge to stand, contagion should result in garden-variety emotions such as sadness and anxiety. Kivy concedes that contagion elicits emotions and that these emotions have music as their object [4]. However, he denies that contagion prompts garden-variety or ordinary emotions. In contagion, he argues, listeners are moved by the music; they feel excitement or enthusiasm, something he later labels “feelings of appreciation” [122]. Music can move us deeply as we attend to its beauty, complexity, subtlety, and expressive properties. Still, this affective appreciation clearly differs from garden-variety emotions such as sadness, happiness, or anxiety.

Kivy’s main argument rests on cognitivism about emotion. Music simply cannot make us feel sad, happy, or anxious. It is not the kind of thing that we evaluate as a loss, as good news, or as a threat. Music is irrelevant to our practical goals. This is why musical audiences do not act in ways that are typical of sadness, happiness, or anxiety. For instance, unlike Melanie who flees away from the threatening ravens, listeners do not leave the concert hall and flee away from the music when anxious music contaminates them. In other words, the action tendencies involved in musical arousal differ from those of garden-variety emotions. The difference also appears clearly in our appreciation of music expressive of negative emotions, such as sad or anxious music (Section 4). It would be puzzling to seek out and enjoy music expressive of negative emotions if it aroused these emotions in us. Why would one enjoy feeling sad or anxious? Appealing to being moved and emotions of appreciation explains the allure of music expressive of negative emotions in a straightforward manner: one enjoys the aesthetic features of the music.

Of course, Kivy concedes that music may elicit garden-variety emotions, but this is explained by idiosyncratic associations. For instance, some music may remind us of an awful event that may sadden us. But these emotions are not about the music per se, and they are irrelevant for its appreciation. As Kivy puts it in his discussion of Beethoven’s *Eroica* [32] (p. 169):

“The listener recognizes the quality of mournfulness in the second movement of the *Eroica*. This recognition reminds the listener of all the things she is unhappy about these days; and the contemplation of these things makes her unutterably sad—she cries. In this way the second movement of the *Eroica* succeeds in making the listener sad. But it is not Beethoven’s success; it is the listener’s failure.”

Kivy goes as far as saying that, strictly speaking, feeling sadness in response to sad music is pathological: nothing bad happened! The same line of criticism applies to theories that conceive of musical arousal in terms of moods ([Section 3.3](#), [\[125\]](#) (p. 279):

“I ask the reader to listen, for example, to one of the well-known Romantic symphonies of Schumann or Brahms or Tchaikovsky, lay his hand upon his heart, and swear to me that he has “felt” his way through it, “mood-wise.” A person susceptible to mood swings like that in listening to absolute music is not just an unusually “sensitive” listener. He is a man with a problem.”

This argument is in line with Kivy’s moderate formalism. Unlike Hanslick, Kivy argues that music can express emotions. In fact, Kivy has offered the most influential theory of expressiveness in terms of the perceived resemblance between music and emotional expressions (“contour theory” [\[70\]](#)). Moreover, unlike Hanslick, Kivy claims that expressiveness is relevant to aesthetic appreciation as long as we pay attention to the intrinsic features of the music. Music can even elicit appropriate emotions. However, these are emotions of appreciation. Music does not elicit garden-variety emotions; or if it does, these are inappropriate responses that distract us from the proper appreciation of the music.

If contagion does not elicit the same emotion as the emotion which is perceived in music, the Value Challenge does not arise. For instance, listeners do not evaluate sad music as unfortunate, as they do not feel genuine sadness. Moreover, if contagion induces the emotion of being moved, we are moved by the music or its aesthetic quality (the same holds for feelings of excitement and appreciation). The music is the unproblematic object of our emotion. This captures the tight link between emotion and music, and it does justice to the importance of emotions in our appreciation of the music. The challenge is dissolved because music simply does not move us to feel garden-variety emotions.

Kivy’s view has been extensively criticized [\[29,126\]](#). From the point of view of the phenomenology of music, the proposal has been considered incredible. Intuitively, contagion elicits garden-variety emotions. Sad music, for instance, makes us feel sad. This is the explanandum! When sad music moves us, it does so partly because it makes us feel sad. The proposal does not do justice to our deep affective involvement with music.

In reply to this objection, Kivy has argued that his proposal is compatible with strong emotional involvement with music. In fact, it is designed to accommodate it. Being moved by music can be profound. Nonetheless, the emotions felt in response to music are not of the garden-variety kind. People are simply wrong to think that, say, sad music makes them feel sad. They confuse the emotion perceived in music with the emotion felt. They wrongly attribute the emotion they perceive in the music to themselves. They are prone to a misattribution error. After all, misattribution errors happen very often.

However, philosophers have not been convinced by this reply. Many scholars agree that emotion perception importantly differs from emotion induction. A music critic may perceive a musical piece as expressive of sadness without feeling sad or any emotion whatsoever, for instance when the piece is poorly crafted or performed (pace arousal theorists). As observed, subsequent to Gabrielsson’s seminal experiment [\[33\]](#), the distinction between internal locus (emotion felt) and external locus (emotion perceived) is now well established in the psychology of music. Still, in contagion emotion perception and emotion induction coincide. Sad music can make listeners feel sad, whether this feeling is full-blown sadness or the mere feeling component of sadness. Denying this violates phenomenology. Saving cognitivism at this cost would be a desperate move.

Fortunately, we can avoid this phenomenological battle by considering empirical findings.

Empirical findings corroborate the skeptical intuition. Krumhansl realized experiments designed to test Kivy's hypothesis through self-reports and physiological measures [27]. The study used excerpts of absolute music expressive of sadness (e.g., Barber's Adagio for Strings), happiness (e.g., Vivaldi's Spring), and fear (e.g., Mussorgsky's Night on Bald Mountain), inter alia. Along with other experiments, results reveal that contagion induces feelings that significantly share features of ordinary emotions in terms of physiological changes, neural bases, facial expressions, and behavior [9,27,127,128,129]. For instance, contagion with sad music involves changes in electrodermal activity, heart rate, respiration rate, and temperature that are characteristic of sadness. Sad music triggers corrugator muscle activity (as in frowning), while happy music triggers zygomatic muscle activity (as in smiling), just like ordinary sadness and happiness. Contagion with sad music is also accompanied by the typical behavioral and cognitive modifications of sadness, such as walking or talking slowly, increased recognition of sad faces, rumination, etc. At the neurobiological level, it involves neural patterns in limbic and paralimbic structures that are characteristic of ordinary sadness. These empirical results speak against Kivy's proposal [130].

However, Kivy has criticized this interpretation of the findings and argued that they are compatible with his cognitivist theory [131,132]. He mentioned several qualms about the conclusions one may draw from experiments of this kind (particularly Krumhansl's experiment). For one thing, given the misattribution error described earlier, it is an open possibility that participants confused the emotions perceived with the emotions felt (see also [133]). This tendency may have been exacerbated by the pressure on behalf of the experimenter to report felt emotions. Participants were also forced to choose between a limited set of discrete emotions, which may have biased their reports. Self-reports thus cannot be trusted. However, this reply is empirically questionable, given the recent emphasis on the distinction between the two loci of emotion. For instance, perceiving emotion in music is more frequent than feeling emotions [33,57,134]. Emotion perception mostly depends on acoustic properties [135], whereas emotion induction depends on many other factors, especially features of the listener such as current mood, musical competence, and preferences [58]. As discussed in detail by Young [41] (pp. 52-54), studies reveal that participants master the distinction between emotion perceived and emotion felt [57,134,136]. This distinction is explicitly emphasized in the instructions of many of the aforementioned experiments. Kivy's error theory is empirically dubious.

A second and more convincing line of criticism offered by Kivy explains the findings in terms of covert associations [131,132]. As observed, Kivy concedes that music can arouse garden-variety emotions through associations. Now, the experiments do not ensure that participants were engaged in the formalist way of listening (that is, seriously paying attention to the music alone). Perhaps participants were engaged in other ways of listening that involve mind-wandering of the kind described earlier or the conjuring of images and narratives. After all, this way of listening is typical of some listeners. In the absence of clear descriptions of what listeners had in mind while listening to the music, the results are simply indecisive. Even if music induced say, sadness in participants, this does not suffice to show that it would affect appropriate listeners in the same way. The garden-variety emotion induced could be explained by associations between music and extra-musical entities prompted by titles or cultural associations, particularly because Krumhansl's study used excerpts of programmatic music [101] (p. 663).

It is difficult to completely rule out this hypothesis. Still, as argued by Young [41], it is worth noting that participants did not recognize the musical excerpts and were not notified of the titles. More importantly, Krumhansl's findings have been replicated by numerous experiments using diverse methodologies. The available empirical evidence is vast and points towards a strong consistency between individuals. Robinson and Young thus consider that it is unlikely that idiosyncratic or cultural associations explain this convergence [101] (p. 663), [41] (p. 56). As observed, it is more common to think that biological propensities explain why we perceive emotions in music and are

contaminated by it [74]. See also Konečni for a critical discussion of Krumhansl's conclusions and for different empirical results [133]; see Young for criticisms of this discussion [41].

In a more conciliatory tone, Kivy has conceded that music has the tendency to elicit garden-variety emotions [132, 137]. Nevertheless, and this is a third line of criticism of the empirical results, it remains to be established that listeners were engaged in the canonical way of listening to music. Even if one assumes that experiments show that music induces garden-variety emotions and does so even in listeners who attend to the music alone, this may not correspond to the proper way of listening to music that is relevant for aesthetics. In Kivy [137] (p. 2), he articulates clearly that the stance he is describing consists of paying attention to music and its expressive character alone, as if musical works were pieces of a "sonic museum". The relevant emotion felt, if any, should be elicited directly by paying attention to the artwork and its expressive qualities alone. Now, music often indirectly elicits garden-variety emotions. Consider "La Bamba", a song characterized by its bright, exuberant, and catchy Latin beat. Listeners in a discotheque may feel the urge to dance and move in unison with the beat of the music, and only then feel happy [137] (pp. 7-9). In this case, the emotion felt is explained by the context (namely, dancing in a discotheque) rather than by musical expressiveness or artistic features alone. Kivy thus concludes that the catchiness of "La Bamba" is no threat to his proposal that is meant to capture a specific and subtle kind of musical emotion. This touches on the normative question of the aesthetic and artistic relevance of affective responses to expressiveness (see Cochrane [22] and Ravasio [39] for accounts that emphasize the compatibility between mirroring feelings and the formalist stance on musical appreciation).

As it appears, the critical discussion has focused on the Object Challenge. Being moved by music is an emotion that is directed at the music; hence, the Object Challenge dissolves. However, the proposal has not been examined in detail in light of the Value Challenge. Kivy's solution consists in denying that contagion elicits garden-variety emotions that involve evaluations of situations in light of one's goals. Being moved and emotions of appreciation are elicited by the evaluation of the aesthetic qualities of the music, such as its beauty or well-crafted composition. So far so good.

The worry I would like to raise and which relates to recent developments in affective science concerns the emotion of being moved. At times, Kivy uses the expression "being moved" as an umbrella term that is synonymous with "emotions of appreciation". Yet, he acknowledges that music can move us in the strict sense of the term. Consider, for instance, his description of Ave Maria of Josquin des Prez or of mourning music [32] (p. 158; 161): Kivy confessed being deeply moved by these pieces. In these examples, being moved seems to correspond to the *sui generis* and specific emotion called "being moved". This emotion is typically elicited by reunions, challenging victories, recoveries from bad experiences, the birth of a child, acts of forgiveness, and, most importantly, film and music [138, 139, 140]. Its characteristic expressive and physiological signature consists of chills, tears, and sensations of warmth in the chest [141]. Kivy acknowledges that music can deeply move us in this way, and further developments of his position have followed suit. For instance, in a formalist spirit, Konečni argues that being moved (in the strict sense), awe, and chills are the three main emotions elicited by music [142]. This "trinity" is offered to replace our incorrect and confusing descriptions of musical arousal in terms of garden-variety emotions, thus leading to conceptual improvement. In the same vein, Manuel's ethnographic study reveals that people describe the feelings elicited by musical contagion in terms of being moved, as opposed to garden-variety emotions [143]. Lastly, recent investigations on sad music emphasize that sad music does not elicit sadness *per se* but rather the emotion of being moved [144]. For instance, findings suggest that being moved mediates the aesthetic appreciation of sad music [145]. This offers a new solution to the paradox of sad music (Section 4). For the sake of argument, let us thus assume that music does not elicit garden-variety emotions but the *sui generis* emotion of being moved, at least in some cases. This assumption creates potential difficulties when it comes to dispelling the Value Challenge. Indeed, being moved seems

to involve troublesome cognitive evaluations.

Recently, there has been a surge of interest in being moved [138,139,140,146]. Scholars have recently proposed that being moved is a sui generis emotion, and some consensus emerged. Being moved typically is a bittersweet feeling composed of joy and sadness (and, to a lesser extent, anxiety and anger [140,147]). Consider that you are moved by being reunited with your partner after a long separation. You feel happy; yet, unlike sheer happiness, your experience is tainted with sadness, as you are aware of the separation and struggle you went through. Turning to the Musical Challenge, this mixed phenomenal character of being moved can be redescribed in terms of the following cognitivist gloss. Being moved involves a mixed evaluation. When you are moved (say, by a reunion), you appraise the situation as positive, which elicits joy; yet, you also appraise some negative situation (e.g., you were separated). This is why you are moved rather than merely happy or sad. This experience typically involves the appraisal of the victory of positive values over negative values [138], or a positive foreground against a negative background [140]. If so, the Value Challenge arises again: this is the Value Challenge for being moved by music. When sad music moves us (in the strict sense of the term), as it does often, we should appraise some negative event in the background. But it is unclear whether such an unfortunate event can be found: this was the challenge in the first place. This offers a future direction for research and suffices to switch the burden of proof on the defenders of the appeal to being moved.

For these reasons, the other reactions to the challenge aim at securing the idea that contagion can elicit garden-variety emotions or at least the feelings typical of these emotions. Like Kivy's proposal, they attempt to capture the close relation between contagion and music.

I 5. Rebutting the Challenge: Imagination

Levinson has offered an influential account of expressiveness that appeals to the imagination [148]. In his "persona theory", we perceive music as expressive of emotions because we imagine a persona feeling and expressing emotions. His account of contagion also relies on imagination. Contagion happens when our imaginative involvement with a persona's emotion elicits the same feeling in us. For instance, music saddens us because we imagine a sad persona and a sad story while listening to it. Our feeling is empathetic. In a way, it is akin to feeling empathy for a sad person: contagion involves the personification of music. The imagining need not be very detailed; vague imaginings of a persona feeling and expressing some emotion suffice. In this view, contagion bears important similarities with emotions felt in response to fiction (like when we feel sad for Anna Karenina). Both involve the imagination of personae and empathetic feelings. Strictly speaking, Levinson argues that the feeling elicited by contagion is not a full-blown emotion, as it does not involve the relevant cognitive evaluation and desires characteristic of everyday emotions. Nonetheless, contagion involves similar feelings as those of garden-variety emotions.

Levinson's proposal has many virtues. As observed, imagination plays an important role in our affective responses to music. Contagion often vividly engages our imagination and music therapy exploits the intimate link between emotion and imagery. Moreover, the proposal is in line with the empirical findings on the perception of emotion in music that emphasize the role of affective voice and thus personification in contagion. Most importantly, unlike the other reactions to the Musical Challenge presented, the proposal accommodates the intuition that contagion results in emotional feelings (as opposed to moods) that share the phenomenology of garden-variety emotions (as opposed to feelings of appreciation). This fits our phenomenology.

Although Levinson does not adopt cognitivism about emotion, his proposal can rebut the Musical Challenge as follows. On the one hand, the feelings elicited by contagion are not directed at the music but at the content of one's imaginings. The Object Challenge is thus rebutted. On the other

hand, imagination secures an intimate link between the feeling and the music: the feeling is about the persona imagined in the music. Moreover, the feeling does not involve evaluation of the music per se, as the evaluation pertains to the content of the imagining. The Value Challenge is rebutted. Cognitivism is safe because being infected by music involves cognitive evaluations mediated by imagination like in emotions felt toward fictional situations.

Still, scholars have doubted that contagion necessarily involves imagination. It is not clear that this proposal captures our phenomenology. We sometimes feel sad when listening to sad music without imagining a sad persona, let alone a sad narrative. At least we do not always engage in conscious imaginings of the kind described by persona theory. Contagion, at least sometimes, is much more primitive. It can be triggered by non-cognitive mechanisms, such as rhythmic entrainment and even brain stem reflex [121]. The sudden, dissonant sounds of anxious music and its fast tempo may automatically trigger anxiety in us. Music often contaminates us by affecting our physiology directly without any cognitive mediation, including that of imagination.

Empirical studies corroborate this intuition. As observed, contagion is a different mechanism than imagery (Section 2). For instance, the key brain regions involved in contagion differ from those involved in musical emotions elicited via imagery (e.g., spatially mapped regions of the occipital cortex, visual association cortex [59] (p. 625). Ontogenetically speaking, contagion is observed during the first year of life: 4-month-old infants display facial expressions characteristic of happiness and sadness in response to happy vs. sad music [66]. By contrast, musical emotions elicited by imagery develop only during preschool years [59] (p. 625). Contagion also differs from emotions elicited via imagery with regard to the degree of volitional control. In contagion, the degree of volitional control is low—contagion is considered to be automatic. By contrast, emotions elicited by imagery normally involve a high degree of volitional control: listeners typically conjure up, choose, manipulate, and dismiss images while listening to the music. Of course, images can also come unbidden, and contagion may involve involuntary imagery. But this is far from the proposal considered.

Moreover, the appeal to imagination to describe musical arousal potentially suffers from similar problems raised against the persona theory of expressiveness. For instance, one may think that persona theory gets the order of explanation wrong. In persona theory, expressiveness consists of listeners imagining a persona who feels and expresses some emotion. Yet, one may think that listeners imagine a persona feeling a specific emotion because they perceive music as expressive of this emotion [149]. In this case, expressiveness explains or causes rather than consists of imagining personae. One first perceives expressiveness and only afterward imagines a persona. A similar worry can be raised for the emotion felt in response to expressiveness. In persona theory, the emotion is elicited because one imagines a persona. However, it is intuitive to think that, at least in some cases, listeners imagine, say, a sad persona because sad music makes them feel sad, rather than the other way around. The imaginative involvement would be a consequence of the emotion felt rather than its cause or component. Listeners first perceive sadness in music, the music then contaminates them, and only afterward do listeners imagine a sad persona. After all, sadness comes with negative cognitive bias: when feeling sad, one tends to think about sad things and ruminate, recognize and remember sad stimuli better, etc. This is at least an open possibility that merits to be explored.

Lastly, the persona account is partly inspired by our affective responses to fiction. Just like we can emotionally respond to the fate of fictional characters by imagining them, music induces emotions in us via the imagining of a persona. The problem is that affective reactions to fictional characters often are not of the mirroring kind [150]. One typically feels pity or empathy for Anna Karenina rather than sadness. If emotions felt in response to music are similar to emotions felt in response to fiction, they should be more akin to pity or empathy. The explanandum, however, was garden-variety emotions such as sadness and anxiety. Still, it is unclear whether this objection succeeds.

As observed, Levinson emphasizes that the imagined persona is often a very minimal one. As such, it is often less detailed than the typical fictional characters we imagine in reading novels or watching movies, for instance. This indeterminacy and minimality may explain why music does not typically arouse non-mirroring emotions such as pity. When the imagined persona is more detailed, music may arouse high-level empathy akin to pity [37]. One may still be skeptical, however. Pity may be elicited by pretty minimal perceptions or imaginings of sad people (or of their sad expressions) in the absence of detailed information. It is thus unclear whether differences in specificity suffice to explain the difference in kind between music-induced emotions and affective responses to fiction. Another way to rebut the objection would be to highlight that fiction also typically elicits mirroring responses, such as vicarious fear or sadness for fictional characters [148]. Conversely, one may observe that music may also elicit pity, for instance when one hears an agonized passage and imagines a person in agony [46] (p. 320), [35]. The objector should clarify what is meant by “typical” responses here, which touches on the vexed issue of the paradox of emotions felt towards fiction.

This is not to deny that imagery plays a significant role in contagion [151]. For instance, Cochrane argues that perceiving expressiveness involves the simulation of the emotion perceived [21,22]. Now, simulation recreates feelings (although the feeling may not be of the same kind as the emotion perceived). Simulation may thus partly explain contagion. However, these appeals to imagery or simulation are openly non-cognitivist: in these views, contagion does not involve cognitive evaluation. Hence this role of imagination in contagion does not rebut the Musical Challenge.

If the Musical Challenge stands and imagination cannot rescue cognitivism, and in the absence of a suitable alternative theory, one may as well embrace the challenge and conceive of contagion in non-cognitivist terms: contagion does not involve cognitive evaluations. Let me now present the two main non-cognitivist proposals.

| 6. Non-Cognitivism: Primitive Feelings and Moods

Robinson’s account is in line with her pluralism about emotion [37,109]. Emotions are processes that involve several components (such as physiological changes, appraisals of values, and action tendencies), and music can elicit emotions by affecting each component. Robinson emphasizes how emotions come with different degrees of complexity. Some emotions, such as unrequited passion, are complex: they require mediation of beliefs and concepts. At the other extreme, many emotions—startle responses and primitive feelings of surprise, tension, or relaxation—are much more basic. They do not require cognitive mediation of beliefs and concepts: they are non-cognitive. Now, as already observed, music elicits primitive feelings of this kind, which may result in contagion. For instance, rhythmic entrainment, brainstem reflex, and musical expectations explain at least some cases of contagion [109]. Contagion may be understood in terms of these non-cognitive feelings of surprise, tension, and relaxation.

The so-called « jazzercise effect » describes the transition from primitive feelings to full-fledged emotion induced by the music [36]. The process starts with music arousing physiological changes in the listener, for instance by means of rhythmic entrainment. Through proprioceptive feedback, the listener feels primitive feelings. These feelings in themselves are non-cognitive, hence they are not directed at the music. Yet they give way to cognitive monitoring of one’s situation. In order to make sense of the feeling, listeners look for cues in the environment and respond emotionally to them. Primitive feelings then crystallize into full-fledged emotions. In this view, the feelings elicited by contagion are still not directed at the music. Hence, listeners are not sad about the music, for instance, which is a virtue of the theory. Yet the feelings induced by music may direct one’s attention to the music and the source of the feeling. This secures the relation between feelings and music. In contrast with formalists, Robinson emphasizes how these feelings can

constitute understanding of the music and of its expressive character as long as listeners are engaged in the appropriate way of listening to the music [36] (see Ravasio [39] for more details).

More recently, Robinson explicitly argues that contagion brings about moods understood as affective experiences that are not directed at music nor involve evaluation of it [101]. She describes how music induces physiological and expressive reactions characteristic of moods. Evidence also includes the effects of music on perception, memory, decision-making, and even altruism, which matches the well-documented impact of mood on cognition. Even if contagion can be regarded as eliciting moods, Robinson emphasizes how music can give rise to emotions in various ways simultaneously, for instance through imagining, cognitive appraisal, or action tendencies. This, she thinks, explains the ineffability of affective experiences of music.

Let me present two lines of criticism that will motivate the second main non-cognitivist account [70]. Robinson's theory of contagion aligns itself with Jamesian approaches to emotion according to which emotions are fundamentally bodily feelings or awareness of bodily changes. One important challenge to this view concerns emotional objects. If emotions are bodily feelings, how do they relate to the features of our environment which are considered to be the intentional objects of emotions? If Melanie's fear is simply a bodily feeling, how does it latch onto the ravens threatening her? The standard response appeals to some kind of indirect relation to emotional content: bodily feelings covary with core relational themes and thus indirectly represent them [85]. The same indirect relation holds in Robinson's jazzercise effect. However, it sounds phenomenologically odd to describe our feelings elicited by music as being bodily feelings that only indirectly latch onto music. One may wish to secure a more direct link between emotion and music or, for that matter, emotions and their intentional objects. For this reason, Davies doubts whether the jazzercise effect is a genuine case of contagion from music (rather than some environmental feature) to the listener.

Furthermore, the appeal to primitive feelings rightly emphasizes the various kinds of bodily feelings elicited by music. Yet it seems to lead to an explosion of feelings. When listening to a musical piece, listeners feel myriads of short-term feelings succeeding each other and their emotional state constantly changes. This does not seem to conform to the phenomenology of contagion. Let me turn now to Davies's proposal.

| 7. Non-Cognitivism: Primitive Contagion

Davies offers a general theory of contagion that encompasses and goes beyond music [28,29]. We are often affected by the emotional tone of our environment. When people, nature, or non-sentient objects contaminate us, we perceive an emotion or an emotional appearance—and this induces the same emotion in us. One may be contaminated by one's friend's anxiety because one perceives anxiety in her tone of voice. Or one may feel sad because one perceives a tree as presenting the emotional appearance of sadness, for instance, a sad posture. This process involves the transmission of an emotional state or appearance. The display of emotion plays a causal role and must be perceived by the infected subject. However, the emotion felt by the infected person is not about the emotion perceived. When my friend contaminates me with her anxiety, my anxiety is not about the emotion perceived: I am not anxious about my friend's anxiety—I'm anxious tout court. Contagion also differs from situations where the emotion is about the content of the emotion perceived, such as when you and I are afraid of a lion running over us. Contagion causes an objectless emotion. The emotion has no object because the subject does not have the relevant evaluations or beliefs characteristic of the emotion. We simply catch people's emotions by seeing them.

Similarly, when music infects us, the emotion felt is the same as the emotion perceived. When we resonate with, say, sad music, the emotion felt is sadness. However, the emotion is not about the

music. We are not sad about the music because we do not believe that the music is suffering or unfortunate. The music is the cause of the emotion, not its object. Still, contagion is thoroughly linked with the music: the music is the object of perception and the attentional focus of the response. Listeners pay close attention to the expressive character of the music, which is why contagion matters for musical understanding.

In this respect, the emotion resulting from the contagion that is central to musical understanding differs from affective experiences prompted by inattentive contagion. Sometimes music infects us even though we do not pay attention to it. For instance, background music in a store may make us feel calm: one may hear the music without actively listening to it and without being aware that the music is the cause of one's feelings. This is more akin to an objectless mood. This feeling differs from the close engagement with music described earlier where music is the attentional focus and is recognized as the cause of the emotion. Arguably, emotions prompted by inattentive contagion are not artistically relevant, in contrast with the emotions induced by attentive listening [39].

This proposal is in line with an influential account of social contagion in psychology [26]. Primitive contagion is the tendency to automatically mimic and synchronize with other people's facial, vocal, and bodily expressions, which results in feeling the same emotion. This process is typically unintentional, uncontrollable, and unconscious. It involves mimicry and physiological feedback. The infected subject unconsciously mimics the facial, vocal, and bodily expressions of the infectious subject's emotion (e.g., one's muscles tense and one's voice trembles in synchrony with one's friend's anxious posture and prosody). Physiological feedback from mimicry then unconsciously induces an emotional feeling in the infected subject (one feels anxious as one feels one's muscles tense). There is no need to appeal to cognitive evaluations. This account is motivated by numerous studies [152]. People tend to smile when surrounded by people who smile, newborns tend to cry when hearing other newborns cry, and laughter is highly contagious. Crowds and political protests are other canonical examples.

Turning to music, it has been argued that contagion involves mimicry [107]: for instance, contagion with sad music comes with corrugator activity (as in frowning), while happy music activates zygomatic activity (as in smiling). Although perceiving emotions in other people differs from perceiving emotions in music, the emotional expressions in response to music described may qualify as mimicry, because they are triggered by the perception of expressiveness in music, and expressiveness bears close links to emotional expressions. The correspondence between music and affective prosody described earlier may account for mimicry. Most psychologists and neuroscientists conceive of musical contagion in terms of mimicry and primitive contagion.

Davies, however, takes his distance from this psychological account. He emphasizes how the perception of emotion in music relies on the resemblance between music and bodily postures, gestures, or movements characteristic of emotions (e.g., sad music seems to walk slowly, as sad people do). Likewise, mimicry pertains to bodily postures and movement perceived in music, as opposed to, say, facial or explicitly vocal expressions of emotions (music does not have a face and does not explicitly talk). In addition, mimicry clearly cannot account for contagion in response to colors or weather. For instance, dark rainy days are perceived as somber, and this may depress one. But there is strictly no emotional expression to mimic in that case. Nonetheless, the non-cognitivist spirit of the view is the same. Music contaminates us because its emotional appearances transmit emotions to us in the absence of cognitive evaluation.

Davies's account has many virtues. It offers a unified view of contagion that goes beyond the case of music. It captures the idea that contagion elicits full-blown garden-variety emotions (as opposed to moods or being moved). It secures the close link between contagion and music without being committed to the views that the emotions caused by contagion are about the music or about

the content of one's imaginings. Nor does it construe contagion as resulting in objectless feelings that are only indirectly linked to the music. The music is the content of the perceptual experience, although the emotion is not directed at it. Of course, the view requires the rejection of cognitivism and even of the claim that emotions have intentional objects. But many examples beyond music, such as physiognomic contagion and contagion by tragic or comic masks, show that these claims are untenable.

Davies's account of contagion has been less extensively discussed than his account of expressiveness. Let me mention three lines of criticism.

Robinson argues that this account is unduly cognitive [36]. It assumes that contagion is caused by the perception of expressiveness, the feeling being a mere consequence of this perception. But we are often first contaminated by music and appreciate expressiveness only at a later stage. Music may infect us prior to our recognition of expressiveness (see Davies [70] for a reply).

Madell has also raised concerns about the objects of emotions elicited by music [84]. In Davies's view, the emotion is still not directed at the music. However, non-cognitivism about contagion is compatible with the idea that the feeling is directed toward the music. This would capture the connection between emotion and music in a more straightforward way.

Lastly, the primitive contagion model has been criticized by psychologists. When Davies offered his account, studies on contagion and emotion transmission were in their infancy. However, recent developments in affective science have described in detail when and why people mimic emotions [153]. Studies reveal that contagion and mimicry are less automatic and more cognitive than was initially assumed. For instance, they do not happen in adversary relationships: seeing that one's enemy struggles does not induce struggle but rather joy. Mimicry and contagion require affiliative bonds and the appraisal of the appropriateness of the emotional expression [153]. For these reasons, there is now a main alternative and cognitivist account of emotion transmission in terms of social appraisal that potentially offers a new way to rebut the Musical Challenge (Section 3.8). If musical contagion is not as primitive as scholars assumed, it may as well involve low-level appraisals (Section 3.9).

This entry has presented the chief philosophical problem raised by affective responses to music in light of recent developments in affective science. It has revealed the paramount importance of musical contagion for understanding what emotions fundamentally are and how they contribute to the good life.

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