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Misery Loves Company: Mood-Congruent Emotional Responding to Music

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We examined emotional responding to music after mood induction. On each trial, listeners heard a 30-s music excerpt and rated how much they liked it, whether it sounded happy or sad, and how familiar it was. When the excerpts sounded unambiguously happy or sad (Experiment 1), the typical preference for happy-sounding music was eliminated after inducing a sad mood. When the excerpts sounded ambiguous with respect to happiness and sadness (Experiment 2), listeners perceived more sadness after inducing a sad mood. Sad moods had no influence on familiarity ratings (Experiments 1 and 2). These findings imply that "misery loves company." Listeners in a sad mood fail to show the typical preference for happy-sounding music, and they perceive more sadness in music that is ambiguous with respect to mood.

Keywords: music and emotion, music and mood, mood congruency, music preferences

Music can express a range of emotions, from the joy of a Mozart sonata or Joan Jett's *I Love Rock 'n' Roll* to the despair of a Shostakovich string quartet or The Beatles' *Yesterday*. Moreover, listeners' emotional responses typically parallel the emotions portrayed by the music (e.g., Hunter, Schellenberg, & Schimmack, 2008, 2010). In fact, music is particularly effective at inducing positive or negative moods in the laboratory (Västfjäll, 2002), and musically induced moods have notable effects on cognitive abilities (e.g., Thompson, Schellenberg, & Husain, 2001). Outside of the laboratory, the issue of negative emotional responses to music presents a conundrum for emotion researchers. If sad-sounding music elicits negative feelings, why would anyone choose to listen to it?

As one might expect, theories of emotion consider sadness to be an unpleasant state. For example, the *circumplex model* (Russell, 1980) describes emotions in terms of valence and arousal, with sadness at the negative end of the valence dimension. Appraisal theories (e.g., Smith, Haynes, Lazarus, & Pope, 1993) consider sadness to result from appraising an event as goal-incongruent and low in coping potential. In line with these views, listeners consistently provide more favorable ratings of music pieces that sound happy rather than sad (Hunter et al., 2008, 2010; Thompson et al., 2001; for a review see Hunter & Schellenberg, 2010). Sad-sounding music also elicits a right-sided frontal asymmetry in brain activation (Schmidt & Trainor, 2001), which is an indicator of avoidant tendencies (Harmon-Jones & Sigelman, 2001). Nonetheless, responses to sad-sounding music are not entirely negative (Schubert, 2007). For example, when listeners are asked to rate positive and negative affective responses separately, they report elevated levels on both scales (i.e., ambivalence) after listening to sad-sounding music, but they report only positive affect after listening to happy-sounding music (Hunter et al., 2008, 2010).

Although the prevailing view is that positive and negative emotions are associated with approach and avoidance, respectively (Davidson, 1998), the situation is actually more complex. For example, anger can be associated with withdrawal (Zinner, Brodish, Devine, & Harmon-Jones, 2008) or approach (Carver & Harmon-Jones, 2009). Similarly, sadness may predict low levels of approach rather than avoidance (Carver, 2001). Nevertheless, choosing to listen to sad-sounding music obviously indicates approach.

The nature of affective responses to music is a contentious issue. So-called "emotivists" claim that music elicits true emotions (e.g., Juslin & Västfjäll, 2008), whereas "cognitivists" suggest that responses to music are purely aesthetic and rarely, or never, emotional (Konečni, 2008). Others argue that responses to music are true emotions but that they differ from those experienced in everyday life (Scherer, 2004). For example, feelings of transcendence are reported commonly in response to music and other aesthetic events but infrequent otherwise (Zentner, Grandjean, & Scherer, 2008). Emotional responses to music and other aesthetic stimuli also differ from everyday emotions because they involve two distinct and independent levels—one relating to emotions portrayed by the music or artwork, the other involving an evaluative component (Hunter et al., 2008, 2010). In other words, perceivers can like or dislike works of art whether they portray positive or negative emotions.

Regardless of one's theoretical perspective, music that sounds sad tends to receive lower liking ratings than music that sounds happy (Hunter et al., 2010) and it can have negative effects on arousal levels, moods, and spatial abilities (Thompson et al., 2001). One possibility is that liking for sad-sounding music varies with the listening context. In one study (Schellenberg, Peretz, & Vieillard, 2008), listeners made liking ratings for happy- or sad-

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sounding music. One group of participants made such judgments after a lengthy (25 min) and difficult task that involved monitoring a narrated story. They were required to press one key when they heard the word *and*, another key when they heard the word *the*, and to tally all instances of the word *but*. The typical preference for happy-sounding music was absent among these listeners. The authors provided two hypotheses (not mutually exclusive) to explain this result. One suggested that the monitoring task elicited high levels of negative arousal, and the sad-sounding music (with a slow tempo) reduced arousal levels (e.g., Thompson et al., 2001), leading to greater liking ratings. The other was based on mood congruency; preferences for sad-sounding music increased because listeners were in a negative mood state.

Nonmusical mood-congruency effects are seen reliably when the outcome variables comprise tests of memory or attention. For instance, mood facilitates memory for mood-congruent information (Isen, Shalker, Clark, & Karp, 1978). Although a bias favoring memory for positively valenced stimuli is the norm, induced sadness or clinical depression may switch the bias in favor of negative information (Matt, Vázquez, & Campbell, 1992). Similarly, dysphoria is related to increased attention to negative words and visual images (Isaacowitz, Toner, Goren, & Wilson, 2008; Koster, De Raedt, Goeleven, Franck & Crombez, 2005).

Mood-congruent memory effects are also seen for music. Positive and negative moods lead to enhanced recognition of previously heard major-key (happy-sounding) and minor-key (sad-sounding) melodies, respectively (Houston & Haddock, 2007). If mood-congruent effects with music extend to attention and perception, such effects are most likely to be evident for ambiguous-sounding music. There are multiple cues to emotion in music, among the strongest of which are tempo and mode (for a review see Hunter & Schellenberg, 2010). Fast tempo and major mode suggest happiness, whereas slow tempo and minor mode suggest sadness. When these cues align, listeners perceive relatively pure happiness (fast-major) or sadness (slow-minor) in the music. When they conflict (i.e., fast-minor or slow-major), however, listeners perceive mixed happiness and sadness (Hunter et al., 2010). The listener's mood may make one cue more salient than the other in these instances, with happy listeners attending to the fast tempo or major mode, and sad listeners focusing on the slow tempo or minor mode.

In the present study, we tested two mood-congruency hypotheses. In Experiment 1, we tested whether happy, neutral, and sad moods influence liking for happy- and sad-sounding music. After a mood induction, listeners heard either a happy- or a sad-sounding music excerpt. Experiment 2 was identical except that the music sounded ambiguous with respect to happiness and sadness in order to examine whether listeners attend selectively to the cue that matches their mood. In both experiments, listeners provided a liking rating on each trial. They also rated how happy or sad and how familiar each excerpt sounded. We had two predictions of mood congruency, or that "misery loves company." One was that the typical bias for happy-sounding music would disappear when listeners were in a sad mood (Experiment 1). The other was that the perception of sadness in emotionally ambiguous music (neither happy- nor sad-sounding) would be elevated for sad listeners (Experiment 2). Familiarity judgments served as a control measure and were not expected to vary as a function of sad mood in either experiment.

Experiment 1

Method

Participants. Forty-eight undergraduates were recruited without regard to music training from an introductory course in psychology. The students received partial course credit for participating.

Stimuli and apparatus. Hunter et al.'s (2008) stimuli were 48 30-s excerpts from commercial recordings of a variety of music styles. We used a subset of these, specifically the six excerpts that received the highest happy and sad ratings (three each). The happy-sounding excerpts had a fast tempo and were in major mode, whereas the sad-sounding excerpts were slow and minor.

The 36 pictures used in the mood inductions depicted happy (e.g., birthdays), neutral (e.g., buildings), or sad (e.g., injured animals) content. The screen size and resolution of each picture was adjusted so that each appeared to be roughly the same size without any apparent changes in picture quality. Pilot testing confirmed that the 12 "happy" and 12 "sad" pictures received elevated ratings of happy and sad feelings, respectively, and that the 12 "neutral" pictures did not elicit either happy or sad feelings. Captions were added (e.g., "Death of a Friend") to emphasize the positive, neutral, or negative affect of the pictures.

Except for the written responses to the pictures, testing was controlled by a Macintosh computer with customized software written in PsyScript version 2.1 (Slavin, 2007).

Procedure. Participants were tested individually. They were told that they would be seeing pictures, listening to music, making ratings of both, and that they would be asked to write a short reflective statement about some of the pictures. The different mood inductions were blocked, with the happy block first, the neutral block second, and the sad block last for half of the participants, and the opposite order (sad-neutral-happy) for the other half. Within each block, there were two separate mood inductions, each followed by a music-listening trial. These trials consisted of one happy- and one sad-sounding music excerpt selected randomly, but with no excerpts repeated across blocks.

During each mood induction, participants saw a series of six pictures intended to elicit happy, neutral, or sad feelings. Each picture was displayed on the monitor for 15 s followed by a 7-point (0–6) bipolar sad-happy rating scale with the question, "How did the picture make you FEEL?" Participants then chose one of the six pictures about which to write a reflective statement with pen and paper. They were asked to write three or four sentences indicating how they felt about the image, memories that were evoked, or simply a few descriptive sentences.

Participants then heard a happy- or sad-sounding music excerpt. They were asked: (1) "How much did you LIKE the music?" (2) "How happy or sad did the music SOUND?" and (3) "How familiar did the music SOUND?" Responses were recorded on 7-point scales. Differences among questions were emphasized by the use of uppercase letters, as shown.

Results and Discussion

Mood induction. Each participant had three mood scores, with each score averaged over 12 original feeling ratings that were made in response to the happy, neutral, or sad pictures. A one-way

repeated-measures Analysis of Variance (ANOVA) confirmed that the mood induction was highly effective, $F(2, 94) = 484.16$, $p < .0001$, $\eta_p^2 = .91$. Happy pictures ($M = 4.49$, $SD = .55$) made participants feel happier than neutral pictures ($M = 3.08$, $SD = .21$), $t(47) = 14.91$, $p < .0001$, which, in turn, made participants feel happier than sad pictures ($M = 1.04$, $SD = .63$), $t(47) = 22.60$, $p < .0001$.

Liking. Each participant had six liking ratings, one after each of the three mood inductions for both a happy- and a sad-sounding music excerpt. Descriptive statistics are illustrated in Figure 1 (upper panel). A two-way repeated-measures ANOVA revealed a main effect of music emotion, $F(1, 47) = 15.40$, $p < .0005$, $\eta_p^2 = .25$. In general, listeners exhibited the typical preference for happy- over sad-sounding music. This main effect was qualified, however, by an interaction between induced mood and music emotion, $F(2, 94) = 3.18$, $p < .05$, $\eta_p^2 = .06$. As predicted, listeners exhibited a preference for happy- over sad-sounding music after the happy, $t(47) = 2.02$, $p < .05$, and neutral, $t(47) = 4.35$, $p < .0001$, mood inductions, but not after the sad mood induction, $p > .4$. As shown in the figure, for listeners in a sad mood, absolute levels of liking for happy- and sad-sounding music were virtually identical.

Perceived emotion. Each listener also had six ratings of perceived emotion. Descriptive statistics are illustrated in Figure 1 (lower panel). A two-way repeated-measures ANOVA yielded no main effect of induced mood on perceived emotion, and no interaction between mood and music emotion, Fs < 1. A main effect of music emotion confirmed simply that listeners thought that the happy-sounding music sounded happier than the sad-sounding music, $F(1, 47) = 138.06$, $p < .0001$, $\eta_p^2 = .75$.

Familiarity. Each listener's six familiarity ratings were examined identically. There was no main effect of induced mood on familiarity judgments, $p > .2$, and no interaction between induced mood and music emotion, $F < 1$. Rather, happy-sounding excerpts ($M = 3.19$, $SD = 1.11$) were deemed to sound more familiar than sad-sounding excerpts ($M = 2.20$, $SD = 1.30$), $F(1, 47) = 37.98$, $p < .0001$, $\eta_p^2 = .45$. This finding is consistent with others indicating that participants tend to provide higher familiarity ratings for positively rather than negatively valenced pictures (Cacioppo, Bush, & Tassinary, 1992) and music (Witvliet & Vrana, 2007).

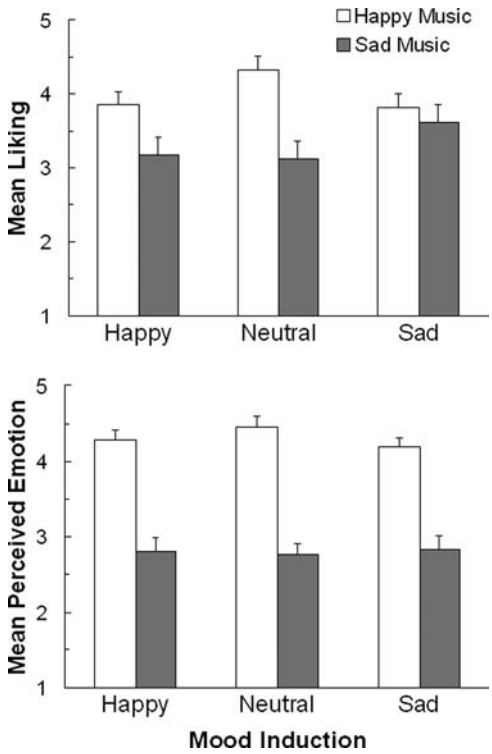

Figure 1. Ratings of liking (upper panel) and perceived emotion (lower panel) for happy- and sad-sounding music as a function of mood induction (Experiment 1). Higher ratings correspond to greater liking (upper) and more perceived happiness, but less sadness (lower). Error bars are standard errors.

Experiment 2

Method

Participants. Fifty-four undergraduates were recruited as in Experiment 1.

Stimuli and apparatus. The stimuli and apparatus were identical to Experiment 1 except that the six 30-s music excerpts were those from Hunter et al. (2008) that evoked the highest levels of mixed (happy and sad) feelings. These six excerpts had conflicting cues to happiness and sadness, specifically fast tempo and minor mode for three, and slow tempo and major mode for the other three.

Procedure. Identical to Experiment 1, except that after each of the three mood inductions, listeners heard two ambiguous-sounding music excerpts selected randomly from the set of six but with no repetitions.

Results and Discussion

The data were analyzed as in Experiment 1 except that there was no independent variable for music emotion because all of the music excerpts sounded ambiguous with respect to happiness and sadness.

Mood induction. The mood-induction procedure was again highly effective, $F(2, 106) = 758.35$, $p < .0001$, $\eta_p^2 = .93$. Happy pictures ($M = 4.50$, $SD = .49$) evoked more sadness than neutral pictures ($M = 3.05$, $SD = .21$), $t(53) = 21.16$, $p < .0001$, which evoked more sadness than sad pictures ($M = 1.14$, $SD = .54$), $t(53) = 23.85$, $p < .0001$.

Liking. A one-way repeated-measures ANOVA examined liking ratings for ambiguous-sounding music after happy, neutral, or sad mood inductions. Liking varied as a function of the mood induction, $F(2, 106) = 5.29$, $p < .01$, $\eta_p^2 = .09$ (Figure 2, upper panel). Liking was elevated after the happy mood induction compared to the neutral, $t(53) = 2.07$, $p < .05$, and sad, $t(53) = 3.21$, $p < .005$, mood inductions, which did not differ, $p > .2$. This result is consistent with the well established finding that feeling happy and liking are often two markers of the same construct: positive affect (e.g., Fredrickson & Losada, 2005).

Perceived emotion. Perceived emotion ratings also varied as a function of the mood induction, $F(2, 106) = 6.52$, $p < .005$, $\eta_p^2 = .11$ (Figure 2, lower panel). As predicted, ratings were lower (more perceived sadness) after the sad mood induction than

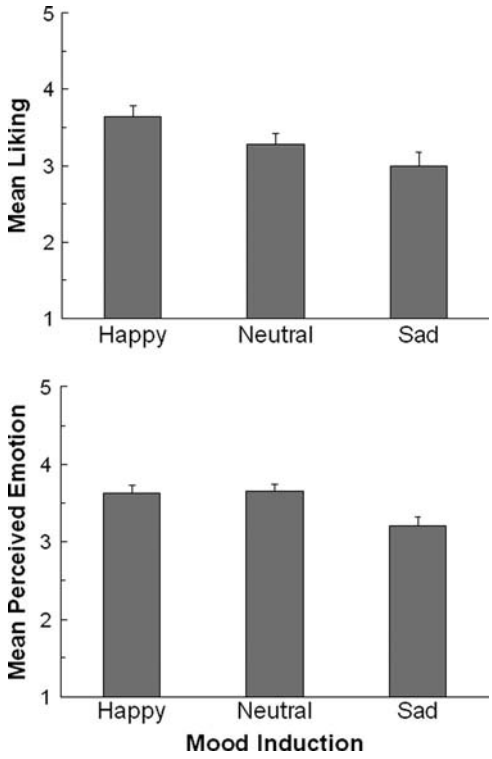

Figure 2. Ratings of liking (upper panel) and perceived emotion (lower panel) for ambiguous-sounding music as a function of mood induction (Experiment 2). Higher ratings correspond to greater liking (upper) and more perceived happiness, but less sadness (lower). Error bars are standard errors.

after the happy, $t(53) = 2.89$, $p < .01$, or neutral, $t(53) = 3.18$, $p < .005$, mood induction, which did not differ, $p > .8$. In other words, the perception of sadness conveyed by emotionally ambiguous music was elevated among listeners who were feeling sad. Perceived sadness after the sad mood induction did not vary between fast-minor and slow-major excerpts, $F < 1$.

Familiarity. Induced mood had no effect on familiarity judgments, $F < 1$.

General Discussion

After inducing happy, neutral, or sad moods, we compared reactions to happy- and sad-sounding music (Experiment 1) and to ambiguous-sounding music (Experiment 2). Although happy music was preferred to sad music after a happy or neutral mood induction, this preference disappeared after a sad mood induction. Sad moods also increased the perception of sadness in music when the music was not clearly happy- or sad-sounding. In short, the results provided support for both of our "misery-loves-company" hypotheses.

Whereas Schellenberg et al. (2008) eliminated the typical preference for happy-sounding music after an arduous and lengthy task, our findings allowed us to attribute the effect to sad mood. Previous findings indicate that liking music increases when there is a match between listeners' perception of emotions conveyed by the music and their responses to it (Schubert, 2007). The present findings reveal that music liking is also enhanced when feelings unrelated to music match the emotion conveyed by music heard subsequently. Our findings do not preclude the possibility that listeners sometimes prefer sad-sounding music for other reasons, such as its arousal-reducing properties or because of idiosyncratic personality or contextual factors. In future research, physiological measures may be useful for determining the role of arousal reduction. One could also examine whether sad-sounding music is liked by listeners for whom sadness is chronic (e.g., those with depression or dysthymia) rather than transient, and whether listening to sad-sounding music increases or reduces sadness among these individuals.

Our findings also extended mood-congruency effects to perceiving emotion in music. In Experiment 1, when the emotion cues in the music excerpts clearly suggested happiness or sadness, there was no effect of mood on perception. In Experiment 2, however, cues to happiness and sadness were in conflict, and mood influenced perceptions. Sad listeners gave higher ratings of perceived sadness, presumably because they selectively attended to the "sad" cue in the music (slow tempo or minor mode). By contrast, listeners in a happy or neutral mood perceived less sadness and more happiness in the music, which implies that they attended more to the "happy" cue (fast tempo or major key). This interpretation is consistent with positive and negative biases in memory (Matt et al., 1992) and attention (Koster et al., 2005) for nondepressed and depressed individuals, respectively. The preference for happy-sounding music after a neutral mood induction is also consistent with typical positive biases in perception. Neutral mood appears to involve a default positivity bias, which explains the preference for happy-sounding music seen in previous studies with no induced moods (e.g., Hunter et al., 2008).

Our original question asked why people listen to sad music if it makes them feel sad. Our results indicated that sad moods make sad-sounding music more appealing, yet it is still unknown whether this is in spite of additional sad feelings elicited by the music, or whether music did not give rise to such feelings despite abundant evidence of effects of sad-sounding music on mood (Västfjäll, 2002). Siemer (2005, Experiment 2) demonstrated that musically induced moods tend to be accompanied by mood-congruent cognitions. Perhaps listeners in an initially happy or neutral mood found sad-sounding music to be unpleasant because it elicited sad thoughts. By contrast, listeners in a sad mood would already be thinking sad thoughts, so the effect of the music on their cognitions would be moot.

An alternative perspective suggests that sadness derived from aesthetic experiences does not carry the same negative affective weight as sadness elicited under everyday circumstances. For example, when Goldstein (2009) compared sadness in response to personal events or fictional narratives, both stimuli elicited sadness but only personal events elicited anxiety as well. The author suggested that fiction acts as a safe environment in which to experience negative emotions. Music may provide a similar safe environment. This hypothesis is consistent with Scherer's (2004) proposal that emotions induced by aesthetic sources differ from those aroused in everyday situations because the latter involves a goal-relevant appraisal whereas the former does not. For example, sadness felt when receiving a bad test grade is unpleasant because it is inconsistent with one's achievement goals, whereas sadness

evoked when listening to *Yesterday* is not unpleasant because the song is goal-irrelevant.

In the present study, however, listeners in happy and neutral moods found sad-sounding music to be relatively unpleasant. Some research suggests that there are different styles of music listening (Kreutz, Schubert, & Mitchell, 2008). Whereas *music systemizers* tend to focus on music as an object, *music empathizers* process music as emotional communication. For systemizers, sad cognitions may not arise when listening to sad-sounding music because they are attending to its aesthetic merits rather than the emotion expressed. If so, the effects in the present study may have been driven by music empathizers in the sample. Future studies could test whether systemizers are resistant to negative mood effects of sad-sounding music.

Our results motivate several additional hypotheses that could be tested in future research. For example, researchers could examine directly whether the appeal of sad-sounding music increases when the music does not elicit negative thoughts or anxiety, and whether liking for sad-sounding music is mediated by increased attention and deeper processing. Our results have practical applications for music therapy among depressed patients and, more generally, for modulating one's own moods. They also suggest new avenues of research, such as whether the findings would extend beyond music. If so, the general tendency to avoid stimuli associated with sadness may be attenuated for those who are feeling sad. Indeed, sad mood may be one route to the pleasure of sadness in aesthetic experiences.

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