

Research Article

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The Association Between Music Engagement and Self-Reported Mental Health

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Article Info

Article Notes

Received: January 21, 2026
Accepted: February 24, 2026

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Keywords:

Music
Mental Health
Depression

Abstract

Music is widely used for mood regulation, stress relief, and social connection, but individuals differ in how music relates to their mental well-being. Using the public Music & Mental Health (MxMH) survey dataset (N = 736) hosted on Kaggle, this paper examines whether everyday music listening and perceived effects of music are associated with self-reported symptoms of depression and related concerns. Respondents reported average daily music listening (hours/day), several music-engagement characteristics, and symptom ratings for anxiety, depression, insomnia, and obsessive-compulsive disorder (OCD) on 0–10 scales.

Two research questions guided the analysis: (1) Is time spent listening to music associated with higher or lower depression scores? and (2) Do depression scores differ across participants who report that music improves, worsens, or does not affect their mental health? Statistical analyses included Pearson correlation and multiple linear regression, as well as nonparametric group comparisons (Kruskal–Wallis and Mann–Whitney U tests). Listening time showed a small positive association with depression ($r = 0.111$, $p = 0.003$).

In a regression model adjusting for age and select listening-context variables, hours/day remained a modest predictor of depression ($b = 0.089$, $p = 0.022$), while age was negatively associated with depression ($b = -0.028$, $p = 0.003$). Depression scores differed across perceived music-effect groups (Kruskal–Wallis $H = 13.40$, $p = 0.001$), with the “worsen” group reporting higher depression than both the “improve” and “no effect” groups. Limitations include self-report measurement, cross-sectional design, and potential selection bias. Although several associations reached statistical significance, effect sizes were small, underscoring the need for cautious interpretation.

Introduction

Depression and anxiety are among the most common mental health concerns and contribute substantially to disability and reduced quality of life. In the United States, the National Institute of Mental Health estimates that 21.0 million adults experienced at least one major depressive episode in 2021¹. Globally, the World Health Organization estimates that approximately 5.7% of adults experience depression². Because symptoms are prevalent and recurrent, accessible strategies for emotion regulation and stress reduction are of high interest for both prevention and self-management.

Music is a particularly accessible and culturally ubiquitous form of engagement. People often use music intentionally to regulate mood, reduce stress, focus during work or study, and connect socially. Clinical research on structured music interventions has found evidence of benefit across a range of outcomes. For example, a Cochrane review reported that music therapy added to standard care

can improve depressive symptoms and anxiety compared with standard care alone³. Meta-analytic evidence also suggests that music-based interventions can reduce anxiety⁴ and improve stress-related outcomes⁵. However, most everyday music listening occurs outside clinical settings, with substantial variation in genres, listening contexts, and individual preferences.

At the same time, music engagement may be complex: some individuals may select certain music when experiencing distress, and certain listening habits may co-occur with worse symptoms. Observational studies and surveys therefore help clarify how self-selected listening relates to self-reported mental health in the general population. Understanding these associations is valuable for interpreting how music functions in daily coping and for generating hypotheses for future experimental work.

This study analyzes the Music & Mental Health (MxMH) survey, a public dataset that includes self-reported music listening behaviors and symptom ratings for anxiety, depression, insomnia, and obsessive-compulsive disorder (OCD). Two research questions guide the analysis:

1. Is the amount of time spent listening to music (hours per day) associated with depression scores?
2. Do depression scores differ across respondents who report that music improves, worsens, or does not affect their mental health?

Based on prior literature suggesting that music can support emotion regulation and stress reduction, one might expect lower symptom scores among individuals who report benefits from music. However, if music is used as a coping response during periods of distress, higher listening time could also be associated with higher symptoms. The analyses below evaluate these competing possibilities using appropriate descriptive and inferential statistics.

Despite growing evidence that structured music therapy can improve mental health outcomes, less is known about how everyday, self-selected music listening relates to depressive symptoms in nonclinical populations. Observational evidence on whether greater listening time is associated with better or worse mental health remains limited and mixed.

Existing research has largely focused on structured music therapy or experimental interventions, while observational studies of self-selected listening often treat music engagement as homogeneous behavior. This limits understanding of why music may be experienced as beneficial for some individuals but detrimental for others. The present study does not test genre- or mood-specific effects directly; however, by examining perceived effects of music alongside listening time, it provides an initial step toward identifying heterogeneity in music-related coping that future work can explore in greater depth.

Data and Methods

Data Source

The dataset analyzed in this study is the Music & Mental Health Survey Results dataset hosted publicly on Kaggle⁶. The survey was designed to explore potential relationships between music listening habits and self-reported mental health.

The dataset includes 736 responses. Each row represents one unique respondent. Respondents provided demographic information (e.g., age), music engagement characteristics (e.g., primary streaming service, favorite genre, and whether they typically listen while working), and self-ratings of mental health symptoms.

Measures and Variables

Self-reported symptom severity for depression, anxiety, insomnia, and obsessive-compulsive symptoms was assessed using single-item 0–10 rating scales (0 = does not experience; 10 = experiences regularly). These items are not validated diagnostic instruments and do not correspond to standardized clinical assessment tools. Rather, they capture respondents' subjective perceptions of symptom severity at the time of the survey.

The primary outcome variable was the self-reported depression score measured on the 0–10 scale. Secondary symptom ratings were also available for anxiety, insomnia, and obsessive-compulsive symptoms using the same response format. The key explanatory variable for Research Question 1 was average daily music listening time ("Hours per day"). To address Research Question 2, the dataset included a categorical item ("Music effects") indicating whether respondents perceived music as improving, worsening, or having no effect on their mental health.

Data Cleaning and Preparation

Most variables were complete; age contained one missing value and was omitted only in regression models requiring age. Categorical variables were coded as factors for modeling (e.g., "While working" coded as Yes/No). Because the dataset is observational and self-reported, no causal claims are made.

Statistical Analysis Plan

Age was included as a covariate due to its well-documented association with depression, while listening-context variables (listening while working and exploratory listening) were selected to account for differences in listening behavior that could plausibly relate to mood or symptom reporting. Linear regression assumptions were evaluated through visual inspection of residual plots; given the large sample size, minor deviations from normality were not considered to materially affect inference.

Descriptive statistics (means, standard deviations, and ranges) were computed to summarize the sample and key variables. For Research Question 1, a Pearson correlation coefficient quantified the linear association between hours/day and depression. A multiple linear regression model then estimated the association between hours/day and depression while adjusting for age and two listening-context variables (listening while working and exploratory listening). For Research Question 2, depression scores were compared across the three “Music effects” groups. Because group sizes were highly unbalanced (particularly the small “worsen” group), a nonparametric Kruskal–Wallis test was used as the primary overall comparison, followed by Mann–Whitney U tests to compare the “worsen” group with each of the other groups. All tests used a two-sided alpha level of 0.05. Analyses and figures were generated in Python using standard statistical libraries.

Results

Descriptive Statistics

The sample included 736 respondents. The average age was 25.21 years (SD = 12.05). Respondents reported listening to music for an average of 3.57 hours per day (SD = 3.03), with a range from 0.0 to 24.0 hours. Mean symptom ratings were 5.84 for anxiety, 4.80 for depression, 3.74 for insomnia, and 2.64 for OCD (all on 0–10 scales). Table 1 summarizes key continuous variables.

With respect to perceived effects of music on mental health, most respondents reported that music improves their mental health (n = 542, 74.5%), while 169 (23.2%) reported no effect and 17 (2.3%) reported that music worsens their mental health (Table 2).

Research Question 1: Listening Time and Depression

Hours per day showed a small positive association with depression (r = 0.111, p = 0.003). While the correlation is statistically significant, the magnitude indicates a weak

linear relationship. Figure 1 shows the scatterplot and fitted line.

A multiple linear regression model estimated depression as a function of hours/day, age, listening while working, and exploratory listening. The model was statistically significant overall (F = 4.60, p = 0.001), but explained a small proportion of variance (R² = 0.025). Holding other variables constant, each additional hour/day of listening was associated with a 0.089-point increase in depression score (p = 0.022). Age was negatively associated with depression (b = -0.028, p = 0.003), suggesting lower depression scores among older respondents in this sample.

Research Question 2: Depression by Perceived Music Effects

Depression scores differed across the three “Music effects” categories (Kruskal–Wallis H = 13.40, p = 0.001). Group means were 4.86 (SD = 2.91) for “improve,” 4.38 (SD = 3.25) for “no effect,” and 7.18 (SD = 3.11) for “worsen.” Figure 2 illustrates these differences via boxplots.

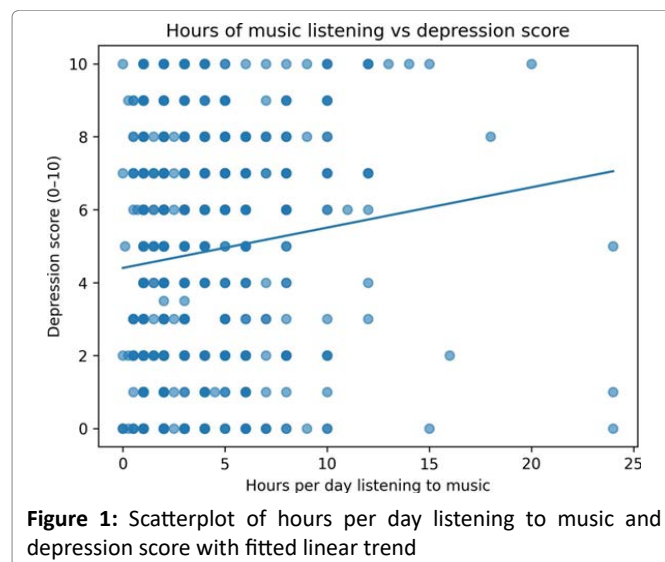


Figure 1: Scatterplot of hours per day listening to music and depression score with fitted linear trend

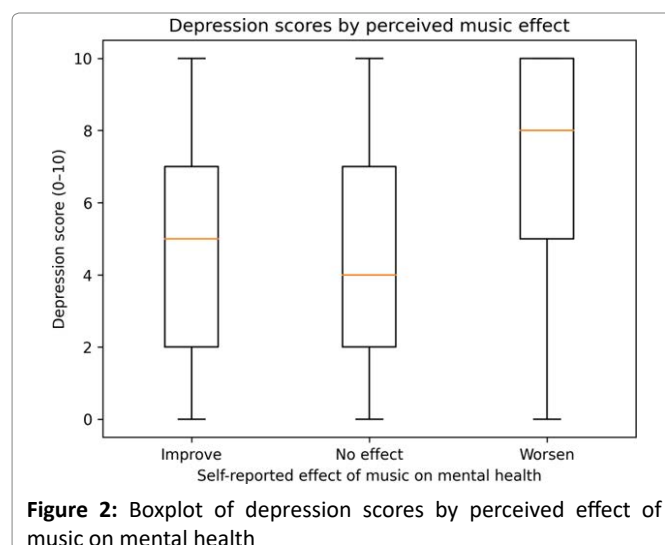


Figure 2: Boxplot of depression scores by perceived effect of music on mental health

Table 1: Descriptive Statistics for Continuous Variables

Variable	Mean	SD	Min	Max
Age	25.21	12.05	10.00	89.00
Hours per day	3.57	3.03	0.00	24.00
Anxiety	5.84	2.79	0.00	10.00
Depression	4.80	3.03	0.00	10.00
Insomnia	3.74	3.09	0.00	10.00
OCD	2.64	2.84	0.00	10.00

Note: Symptom variables are self-ratings on 0–10 scales (0 = does not experience; 10 = experiences regularly)

Table 2: Perceived Effect of Music on Mental Health

Music effects category	n	Percent
Improve	542	74.5%
No effect	169	23.2%
Worsen	17	2.3%

Follow-up Mann-Whitney U tests indicated that the “worsen” group reported higher depression than the “improve” group ($p = 0.002$) and higher depression than the “no effect” group ($p = 0.001$). In contrast, depression scores did not differ significantly between “improve” and “no effect” in a Welch t-test ($t = 1.73$, $df = 257.6$, $p = 0.085$).

Group comparisons should be interpreted with caution due to the strong imbalance in group sizes, particularly the small “worsen” group ($n = 17$). Nonparametric tests were therefore selected to reduce sensitivity to distributional assumptions and unequal variances. Post hoc comparisons focused specifically on contrasts involving the “worsen” group, given its theoretical relevance despite limited statistical power.

Discussion

This study examined associations between music engagement and self-reported mental health symptoms using the public MxMH survey dataset. Two key findings emerged. First, average daily listening time was weakly but positively associated with depression, and this association remained statistically significant after adjustment for age and listening-context variables. Second, respondents who reported that music worsens their mental health exhibited notably higher depression scores than those who reported improvement or no effect.

The present findings are best interpreted within theoretical frameworks emphasizing emotion regulation and coping rather than causal models of symptom reduction. From this perspective, music listening may function as a compensatory or regulatory behavior that increases during periods of emotional distress. Observational studies of coping behaviors have similarly found that greater engagement in self-regulatory activities does not necessarily correspond to lower symptom levels, particularly when such behaviors are initiated in response to elevated distress. In contrast to experimental music therapy studies, which manipulate exposure and often demonstrate symptom reduction, the current observational design captures naturally occurring listening patterns, where directionality cannot be inferred.

Interpretation of Listening Time Results

The weak positive association observed here is consistent with prior observational studies suggesting that greater engagement with coping behaviors may co-occur with higher symptom burden rather than reflect symptom reduction. Unlike experimental music therapy studies, observational designs capture naturally occurring behavior, where listening may serve as a response to distress rather than an intervention. The small effect sizes observed indicate that listening time alone has limited practical significance as an indicator of depressive symptoms.

The positive association between hours/day and depression was small in magnitude. One plausible interpretation is that higher symptom burden may lead some individuals to listen to music more often as a coping strategy (e.g., distraction, emotional processing, or companionship). In this account, listening time is a response to distress rather than a cause of distress. Alternatively, extensive listening time could reflect broader patterns (e.g., social withdrawal or rumination) that correlate with higher depressive symptoms. Importantly, the present data cannot distinguish these mechanisms because the design is cross-sectional and observational. The practical implication is that “more listening” is not necessarily a marker of better mental health; it may reflect either adaptive coping or higher baseline distress.

Perceived Effects of Music

Most respondents reported that music improves their mental health. This descriptive finding aligns with clinical and experimental literature indicating that music engagement can reduce stress and support emotion regulation. For example, structured music therapy has shown benefits for depressive symptoms and anxiety when added to standard care³, and meta-analytic work suggests that music-based interventions can reduce anxiety⁴ and improve stress-related outcomes⁵. The survey-based results complement this literature by showing that, in everyday contexts, participants often perceive music as helpful.

The finding that a small subgroup of respondents reported that music worsens their mental health aligns with theoretical accounts emphasizing individual differences in emotional reactivity, rumination, and mood-congruent processing. Music that intensifies negative affect or reinforces maladaptive emotional states may exacerbate distress for some individuals, particularly when listening occurs in isolation or during periods of heightened vulnerability. These results underscore that music engagement is not uniformly beneficial and that its psychological impact is likely contingent on contextual, emotional, and personal factors.

At the same time, a small subgroup reported that music worsens their mental health, and this group reported substantially higher depression. Several explanations are possible. Some individuals may gravitate toward music that amplifies negative affect or triggers distressing memories. Others may use music in ways that reinforce rumination (e.g., repeatedly listening to music that matches or intensifies sadness). It is also possible that respondents with more severe symptoms are more likely to attribute worsening to music because emotional responses during listening are stronger or more volatile.

From a practical perspective, these findings support the idea that music-based coping is highly individualized: while music is often perceived as beneficial, it may be unhelpful for some listeners depending on context, genre, and personal meaning.

Limitations

Several limitations should be considered. First, the dataset relies on self-report measures, including symptom ratings that are not clinical diagnoses. Second, the sample is a convenience sample recruited online, which may overrepresent certain age groups and music engagement patterns (the mean age is relatively young). Third, the cross-sectional design precludes causal inference and does not capture changes over time. Fourth, some groups are small (notably the “worsen” category), reducing precision.

Finally, the analyses examined a limited set of covariates; unmeasured confounding (e.g., socioeconomic status, treatment status, or major life stressors) could influence both music listening and mental health.

Additionally, many statistically significant findings were characterized by small effect sizes, limiting their practical impact despite adequate statistical power. Multiple hypothesis tests were conducted across related outcomes, increasing the possibility of Type I error. Although results were largely consistent in direction and interpretation, these factors further support cautious inference.

Future Research

Future work could extend these findings in several ways. Longitudinal studies could clarify temporal directionality (e.g., whether changes in listening behavior predict symptom changes or vice versa). Experimental designs could test whether structured listening plans, genre-based interventions, or active music-making affect symptoms differently across individuals. Researchers could also incorporate richer measures of music use (e.g., listening goals, lyrical content, emotional response, or social context) to better explain why music helps

some people and worsens symptoms for others. Finally, analyses could explore whether certain music preferences or frequency of listening to specific genres are associated with mental health outcomes while controlling for demographic factors.

Conclusion

Overall, the MxMH survey provides evidence that music is widely perceived as supportive for mental health, but associations between listening behavior and depressive symptoms are modest and heterogeneous. Listening time was weakly associated with higher depression, consistent with the possibility that individuals with greater symptom burden engage more frequently with music as a coping strategy. A small subgroup reporting that music worsens mental health showed notably higher depression, underscoring individual differences in music-based coping. Collectively, these findings suggest that everyday music engagement is best understood as a context-dependent and individualized behavior, with implications for how music is discussed as a tool for emotional regulation in nonclinical settings.

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