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THE MANIFESTATION OF STRESS AND RUMINATION IN MUSICIANS

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ABSTRACT

Here we offer a brief review of research on individual differences that are common to musicians, focusing on our own work on rumination and stress. Rumination and stress have been linked with depression and negative health outcomes. We discuss two of our published studies and two new, unpublished replications that find elevated levels of rumination and stress in musicians. Further, we review literature that finds this combination of rumination and stress might be especially toxic. Even though people frequently use music to help combat stress, musicians may not be taking advantage of their frequent exposure to music, further exacerbating the problem. Interventions aimed at alleviating stress and rumination might prove helpful to musicians.

Keywords: musicians, rumination, stress, health, risk



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INTRODUCTION

I also had a brother who was like me a musician and a composer. A man of great talent, far more gifted than I. He died very young ... he killed himself in the prime of his life.
Gustav Mahler

People are aware of the stereotype of the ‘brilliant but tortured’ musician. Are there certain characteristics of musicians that fuel this image? Research supports the idea that musicians differ from non-musicians in personality characteristics, with musicians tending to be more prone to negative thought patterns (Akinola and Mendes 2008, 1677–86; Cohen and Ferrari 2010, 68–73; Jones, Roy and Verkuilen 2014, 219–226; Verhaeghen, Khan and Joormann 2005, 226–232) and depression (Jamison 1993; Young, Winner and Cordes 2013, 197–202). These differences may lead to negative health outcomes for musicians.

Here we briefly review some of our previously published research that finds differences between musicians and non-musicians in terms of rumination (Jones et al. 2014, 219–226) and stress (Getz, Marks and Roy 2014, 71–85). Further, given recent discussion in psychology on the need for replication (Cumming 2014, 7–29; Lakens and Evers 2014, 278–292; Simmons, Nelson and Simonsohn 2011, 1359–1366), we also present data from two new, unpublished studies replicating and expanding on our past results.

We then briefly review the literature on how rumination and stress in concert may be linked to health problems. Finally, we briefly review some potentially positive ways that music can improve well-being and why musicians may not be harnessing these benefits effectively.

RUMINATION

Rumination is when a person cannot stop thinking about a certain incident or situation and is primarily considered as a maladaptive thought style characterised by intense, repetitive self-reflection (Nolen-Hoeksema, Wisco and Lyubomirsky 2008, 400–424; Trapnell and Campbell 1999, 284–304). It is often been linked to various negative outcomes, including depression (Nolen-Hoeksema et al. 2008, 400–424; Trapnell and Campbell 1999, 284–304). Rumination consists of brooding and reflective rumination subcomponents (Bruwell and Shirk 2007, 56–65; Treynor, Gonzalez and Nolen-Hoeksema 2003, 247–259). Brooding rumination involves repeated negative thoughts that are emotional in nature (Roberts, Gilboa and Gotlib 1998, 401–423; Treynor et al. 2003, 247–259). Reflective rumination involves repeatedly thinking about a negative situation in a manner that is contemplative and active in an attempt to assess and solve the problem (Bruwell and Shirk 2007, 56–65; Roberts et al. 1998, 401–423; Schoofs, Hermans and Raes 2010, 609–617; Treynor et al. 2003, 247–259).

The distinction between types of rumination helps to demonstrate that a ruminative thought style actually might be beneficial in certain situations, such as when it is important to be creative (Cohen and Ferrari 2010, 68–73; Jones et al. 2014, 219–226; Verhaeghen et al. 2005, 225–232; Verhaeghen, Kahn and Joormann 2014, 211–218). Specifically, reflective rumination is associated with artistic creativity such that people high in reflective rumination are more serious about their creative endeavours and exhibit greater overall creativity (Cohen and Ferrari 2010, 68–73; Verhaeghen et al. 2005, 225–232; 2014, 211–218). Creativity can be aided through persistence on a task, such as in exploring a certain idea in depth (Nijstad, De Dreu, Rietzschel and Baas 2010, 34–77). Further, high persistence may aid musicians in gaining the expertise that is typically associated with large amounts of deliberate practice (Ericsson, Krampe and Tesch-Römer 1993, 363–406). High ruminators (brooding and reflective rumination scores combined) performed significantly better than low ruminators on tasks that require perseverance, but significantly worse on tasks that require shifting focus (Altamirano, Miyaka and Whitmer 2011, 1377–1382). Participants high in reflective rumination find it difficult to switch to a new task, possibly because they continue thinking about the previous task (Davis and Nolen-Hoeksema 2000, 699–711; Whitmer and Banich 2007, 546–553). Therefore, creativity may be aided by having a ruminative personality because people exhibiting increased levels of rumination tend to be more persistent when working on a task.

Although a ruminative cognitive style is associated with positive traits, such as increased perseverance, it is nonetheless linked with negative aspects as well. Rumination is thought to play a role in depression (Nolen-Hoeksema et al. 2008, 400–424; Trapnell and Campbell 1999, 284–304), which can potentially account for the high occurrence of depression among musicians and other creative individuals (Jamison 1993; Young, Winner and Cordes 2013, 197–202). This link between rumination and depression is a matter of concern to musicians (who tend to exhibit increased levels of rumination and, potentially in turn, depression) because depression is often associated with poor general health (for example, Strine et al. 2009, 61–64), and more specific health problems, such as an increased risk of coronary heart disease (for example, Whang et al. 2009, 950–958) and a greater likelihood of committing suicide (for example, Kisch, Leino and Silverman 2005, 3–13).

Previous study (1A)

In previously published research, we examined the relationship between rumination and musical ability in 71 students at Elizabethtown College in the USA (43 musicians, 28 non-musicians; 80% females, mean age 19.4; Jones et al. 2014, 219–226). Questionnaire measures of depression symptoms (Center for Epidemiologic Studies Depression Scale (CES-D): Radloff 1977, 385–401) and reflective and brooding rumination (Ruminative Response Scale (RRS)) (Treynor et al. 2003, 247–259)

were administered to all participants. In comparison with non-musicians, musicians exhibited significantly higher levels of reflective rumination, but not brooding rumination or depression.

Further, reflective rumination was related to certain aspects of musical ability. For 22 of the musicians in the sample, performance ability was assessed by juries of two to four faculty members who ranked each musician based on a final performance in the following six categories: tone quality, intonation, articulation, breathing (control), rhythm and musicianship (phrasing and dynamics). Musicians who reported higher levels of reflective rumination also received higher scores on their tone and overall musicianship. The persistence normally associated with reflective rumination might be related to being better able to explore a piece of music, eventually choosing the manner that is most musical and expressive.

Results further indicated that brooding rumination was a better predictor of depression than was reflective rumination. It is therefore possible that the type of rumination important to musicians, reflective rumination, is not as likely to lead to negative outcomes such as depression and poor health. However, participants in this study who were high in one type of rumination also tended to be high in the other type of rumination. It could be that the pathway leading towards depression and health problems in musicians is indirect. To better examine this possibility, we recruited a much larger sample to increase statistical power and further examine the relationships between musical ability, reflective rumination, brooding rumination and depression.

New study (1B)

Participants and methods

In a new, unpublished study, 561 participants (43.5% women; mean age 34.5) were recruited from the participant pool of the Amazon Mechanical Turk website and paid \$1 for taking part in the study. Mechanical Turk is a site where participants are paid for their participation in various tasks available to them, including psychology studies and other research (see Buhrmester, Kwang and Gosling 2011, 3–5, for more information about Mechanical Turk).

Participants completed measures of rumination, depression and self-ratings of their musical ability. Rumination was measured using ten items from the Ruminative Response Scale (RRS)(Treyner et al. 2003, 247–259) aimed at brooding rumination (example question: how often do you think ‘what am I doing to deserve this?’) and reflective rumination (example question: how often do you go away by yourself and think about why you feel the way you do?). Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff 1977, 385–401). This 20-item measurement is used to assess depressive symptoms and has participants rate the extent to which they were experiencing thoughts, feelings

and behaviours associated with sadness, hopelessness, and negative affect (example item: ‘I had trouble keeping my mind on what I was doing’). Finally, to determine the level of musical proficiency, participants rated their musical ability on a 6-point Likert scale from 0 (*No Ability*) to 5 (*Expert*). Instead of dividing participants into two groups based on musical expertise as in Study 1A, here we measured musical ability as a continuous variable going from low to high.

Results and discussion

Consistent with the previous study (Study 1A), self-rating of musical ability was related to reflective rumination, $r(560) = .13, p = .002$. Unlike Study 1A, self-rating of musical ability was also related to brooding rumination, $r(560) = .09, p = .045$ (see Table 1 for all correlations). However, when reflective rumination, brooding rumination and depression were all entered into a multiple-regression analysis predicting self-rated musical ability, $F(3, 557) = 3.17, p = .02, R^2 = .02$, only reflective rumination was a significant predictor of ability, $\beta = .15, p = .02$. Those who perceived themselves as more accomplished musicians tended to also exhibit elevated levels of reflective rumination.

Table 1

	Reflective	Brooding	Depression
Musical Expertise	.128**	.085*	.058
Reflective Rumination		.743***	.436***
Brooding Rumination			.497***

* $p < .05$, ** $p < .01$, *** $p < .001$

As can be seen from Table 1, both reflective rumination and brooding rumination were related to depression. In line with previous research (Jones et al. 2014, 219–226; Treynor et al. 2003, 247–259; Verhaeghen et al. 2014, 211218), multiple regression analysis indicates that brooding rumination was a stronger predictor of depression, $\beta = .39, p < .001$, than was reflective rumination, $\beta = .15, p = .007; F(2, 558) = 96.4, p < .001, R^2 = .25$. This appears to be good news for the musicians studied here because they were higher in the type of rumination that is less predictive of depression. However, there was still a significant link between reflective rumination and depression. Further, people who tended to be high in reflective rumination also tended to be high in brooding rumination, $r(561) = .74, p < .001$. Even though an individual may be more prone to one type of rumination, being high in one type makes experiencing the other type more likely. Higher incidence of depression in musicians (Jamison 1993; Young, Winner and Cordes 2013, 197–202) might be linked to their overall propensity for rumination.

Having a ruminative personality might make it so that musicians are less able to deal with the stressful situations when they happen (Fox, Dutton, Yates, Georgiou and Mouchlianitis 2015, 593–606; Quinn and Joormann 2015, 628–636). In the next section we will consider stress levels in musicians and how these can also contribute to a variety of physical and mental health issues.

STRESS

There are a number of negative health outcomes associated with stress. Individuals with high chronic stress levels are more likely to experience coronary heart disease (Greenwood, Muir, Packham and Madeley 1996, 221–231), hypertension (Turner, Wheaton and Lloyd 1995, 104–125; Williams, Yu, Jackson and Anderson 1997, 335–351), and physical illness in general (Torsheim and Wold 2001, 293–303). People tend to experience high, potentially harmful spikes in their blood pressure when working with effort on stressful tasks (Hilmert, Teoh and Roy 2013, 64–80). In terms of mental health, high stress levels can also lead to depression (Cui and Vaillant 1996, 21–26; Lantz, House, Mero and Williams 2005, 274–288; McGonagle and Kessler 1990, 681–706), psychiatric disorders (Dohrenwend 2000, 1–19), substance and alcohol abuse (Cooper, Russell, Skinner, Frone and Mudar 1992, 139–152), and suicide (Feskanich et al. 2002, 95–98).

Previous Study (2A)

In our previously published study, we found musicians may be more susceptible to stress than non-musicians (Getz et al. 2014, 71–85). Participants ($N = 154$; 80% female; mean age 19.0) completed a survey measuring stress levels experienced in the last month (Perceived Stress Scale (PSS)) (Cohen, Kamarck and Mermelstein 1983, 385–396). Given that high levels of optimism can act as a buffer to stress (Scheier, Carver and Bridges 1994, 1063–1078; Vollman, Antoniw, Hartung and Renner 2011, 145–154) and have been linked with positive health outcomes (Rasmussen, Scheier and Greenhouse 2009, 239–256), we also measured general feeling of optimism (Personal Attributes Optimism Survey (PAS)) (Scheier et al. 1994, 1063–1078). As a measure of musical experience, participants indicated the number of years that they had received musical training with responses ranging from 0 to 15 years. Overall, participants with more musical experience reported experiencing higher levels of stress and lower levels of optimism. In the follow-up study, Study 2B, we elaborated on the previous research by examining whether or not high stress levels in musicians were related to depression and other negative emotions.

New study (2B)

Participants and methods

In a new, unpublished study, 54 individuals (67% women; mean age 18.9) from Elizabethtown College participated in the study for course credit. Participants completed measures of stress experienced in the last month and measures of stress, anxiety and depression experienced in the last week. Long-term stress was measured with the Perceived Stress Scale (PSS) (Cohen, Kamarck and Mermelstein 1983, 385–396). This 10-item scale measures how often in the last month the person has had thoughts such as, ‘How often have you found that you could not cope with all the things that you had to do?’ Participants also completed the Depression Anxiety Stress Scale (DASS) (Lovibond and Lovibond 1995), a 21-item survey consisting of three subscales measuring feeling of depression, anxiety, and stress that the participant has experienced in the last week (example item: ‘I found it difficult to relax’). Finally, participants rated their musical ability on a 6-point Likert scale from 0 (*No Ability*) to 5 (*Expert*).

Results and discussion

Self-rating of musical ability was related to stress felt in the last week, $r(53) = .27$, $p = .05$. Musical ability was also marginally related to ratings of depression, $r(53) = .23$, $p = .09$. None of the other measures was significantly associated with self-rated musical ability (see Table 2).

Table 2

	LT Stress	ST Stress	Anxiety	Depression
Musical Expertise	.143	.269*	.117	.232+
Long-term Stress		.500***	.386**	.549***
Short-term Stress			.581***	.660***
Anxiety				.635***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

As with rumination, measures of shorter-term stress were significantly associated with feelings of depression, $r(53) = .66$, $p < .001$. Multiple-regression analysis indicated that short-term stress, $\beta = .25$, $p = .025$, anxiety, $\beta = .35$, $p = .004$, and long-term stress, $\beta = .34$, $p = .008$, predicted overall depression levels, $F(3, 50) = 22.68$, $p < .001$, $R^2 = .58$. Musicians reported high levels of stress that could lead to depression and other negative outcomes.

THE CONFLUENCE OF RUMINATION AND STRESS

Previous research indicates that rumination and stress are both predictors of depression and negative health consequences (for example, Strine et al. 2009, 61–64; Torsheim and Wold 2001, 293–303). Further, research also links rumination and stress directly; for example, exposure to stressful life events is associated with later increases in rumination, and rumination potentially explains the relationship found between stress and anxiety/depression (Michl, McLaughlin, Shepherd and Nolen-Hoeksema 2013, 339–352). In addition, people exhibiting elevated levels of rumination are more likely to make poor decisions when under stress (Quinn and Joormann 2015, 628–636), show a general deficiency in attentional control when stressed (Fox et al. 2015: 593–606), and expect one stressful event to be followed by another (Watkins, Grafton, Weinstein and MacLeod 2015, 648–658). In turn, this loss of cognitive control when under stress decreases the ability to control future rumination and negative thoughts, leading to a worsening of the situation (Koster, De Lissnyder, Derakshan and De Raedt 2011, 138–145). Musicians appear to be more likely to experience elevated levels of both stress and rumination and therefore may be more at risk for negative health and well-being outcomes due to the interaction of these two factors. However, it remains a question for future research to examine the combined effects of rumination and stress on risk of depression and other negative health outcomes in musicians.

POSSIBLE HEALTH BENEFITS FROM MUSIC

We have discussed a number of reasons to be worried about negative outcomes associated with being a musician in terms of outlook and health. This evidence may seem surprising given findings that the act of listening to music might be beneficial to health and well-being. For example, people often listen to music to help them gain control over their emotions (Juslin and Sloboda 2010; Rentfrow and Gosling 2003, 1236–1256; Saarikallio and Erkkilä 2007, 88–109; Tarrant, North and Hargreaves 2000, 166–173). Specifically, we found that people high in negative affect (Getz, Chamorro-Premuzic, Roy and Devroop 2012, 164–178) and stress (Getz et al. 2014, 71–85) reported frequently using music for emotional regulation. Music also has been shown to help people recover from a stressful episode, quickly reducing the spikes in blood pressure that are associated with stress (Chafin, Roy, Gerin and Christenfeld 2004, 393–403; Chlan 1998, 169–176; Nilsson 2009, 2153–2161).

As musicians have extended exposure to music, it would make sense that they should be more likely to experience these kinds of positive benefits associated with listening to music. However, we highlight reasons why it is possible that musicians might not always receive these presumed benefits of listening to music. For one, people in a sad mood show increased liking for sad music and increased perception of sadness in neutral music (Hunter, Schellenberg and Griffiths 2011, 1068–1072).

More specifically, people with depression may be just as or more likely to listen to sad music to *enhance* their current negative mood rather than to alleviate it (Millgram, Joormann, Huppert and Tamir 2015, 1216–1228; Wilhelm, Gillis, Schubert and Whittle 2013, 76–83). Therefore, it may be that musicians, who report higher stress and depression levels overall, are using music to regulate their emotions, but not necessarily in a *positive* direction (Swaminathan and Schellenberg 2015, 189–197). Indeed, research shows that musicians report intense emotional responding to sad-sounding music (Park et al. 2014, 120–124).

In addition, musicians may not use music in a way that lets them take advantage of its calmativ e properties. For example, our previous study of individual differences in participants' stress, optimism and musical training also investigated why musicians listen to music (Getz et al. 2014, 71–85). Results indicate that individuals with music training (who as discussed earlier were high in stress and low in optimism) tended to listen to music primarily for cognitive stimulation rather than emotional regulation. Musical training may supply musicians with the ability to listen to music more analytically and intellectually and therefore not benefit from music as a form of emotional regulation.

LIMITATIONS AND RECOMMENDATIONS

As a final consideration, the conclusions concerning musicians and negative outcomes may be specific to the populations typically tested, as the majority of research on musicians is conducted with middle and upper class Western participants. When we started a music programme at a disadvantaged public secondary school in South Africa, we found gains in optimism in the students in the programme over a three-year period (Roy, Devroop and Getz 2015). The increase in optimism is opposite to what we found Western musicians (Getz et al. 2014, 71–85). Results from this intervention indicate that it may be important to take context and culture into account when discussing personality and outlook differences in musicians.

CONCLUSION

Even though more research is needed on musicians in various cultures, musicians appear to be more prone to negative health outcomes. Musicians exhibited elevated levels of rumination and stress in comparison to non-musicians. This combination of a ruminative thought style and high stress appears to be a toxic combination potentially leading to higher incidence of depression and health problems. It seems that musicians would benefit from interventions aimed at alleviating rumination and stress (Wang 2015).

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