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The Music of Power: Perceptual and Behavioral Consequences of Powerful Music

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Abstract

Music has long been suggested to be a way to make people feel powerful. The current research investigated whether music can evoke a sense of power and produce power-related cognition and behavior. Initial pretests identified musical selections that generated subjective feelings of power. Experiment 1 found that music pretested to be powerful implicitly activated the construct of power in listeners. Experiments 2–4 demonstrated that power-inducing music produced three known important downstream consequences of power: abstract thinking, illusory control, and moving first. Experiments 5a and 5b held all features of music constant except for the level of bass and found that music with more bass increased participants' sense of power. This research expands our understanding of music's influence on cognition and behavior and uncovers a novel antecedent of the sense of power.

Keywords

music, power, moving first, illusory control, abstract thinking

> I think I should have no other mortal wants, if I could always have plenty of music. It seems to infuse strength into my limbs, and ideas into my brain. Life seems to go on without effort, when I am filled with music.
>
> –George Eliot, *The Mill on the Floss*

Anecdotal and empirical evidence supports George Eliot's assertion that music has a robust effect on both the mind and body. Humans begin processing music as early as in their mother's womb (Mannes, 2011) and music listening precedes reading, television, and movies as a popular recreational activity (Hargreaves & North, 1999; Merriam & Merriam, 1964; Rentfrow & Gosling, 2003; Zentner, Grandjean, & Scherer, 2008). Apart from its pure entertainment value, music is also broadly linked to many desirable outcomes in important aspects of our lives, such as enhanced learning and motivation in school (Boal-Palheiros & Hargreaves, 2001; Seidman, 1981), improved quality and performance in the workplace (Lesiuk, 2005), and even reduced physical pain and other negative symptoms in illnesses (e.g., mood disorders, Alzheimer's disease, autism, and stroke; Hallam, Cross, & Thaut, 2009; Sacks, 2006).

In the current research, we move beyond the previously established effects of music and explore whether music can directly produce an internal sense of power among its listeners. Indeed, the American writer and philosopher Henry David Thoreau once stated, "When I hear music, I fear no danger. I am invulnerable. I see no foe." Although anecdotal evidence and theories across disciplines (e.g., philosophy, political science, health care, clinical psychology, and art) have long supported Thoreau and Eliot's sentiments about an intimate relationship between music and power (Cole, 1992; Jones & Schumacher, 1992; Randall, 2004; Sacks, 2006; Siedliecki & Good, 2006; Silverman, 1996), the capacity of music to stir feelings of power has received almost no empirical attention. Given that power is the foundation of social hierarchy and a critical driver in social life (Galinsky, Gruenfeld, & Magee, 2003; Keltner, Gruenfeld, & Anderson, 2003; Magee & Galinsky, 2008), a systematic investigation of music's effect on power is both theoretically and practically important and may offer a naturally occurring antecedent to a psychological state of power.

Power

Power is a social–structural variable that is readily transformed into a psychological experience (Galinsky et al., 2003; Galinsky, Rucker, & Magee, 2014; Keltner et al., 2003). The experience of power can lead to higher perceived control over social events (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009),

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abstract thinking (i.e., seeing the ''big picture''; Smith & Trope, 2006), and heightened executive functioning (i.e., mental information updating; Smith, Jostmann, Galinsky, & van Dijk, 2008). At the behavioral level, power can also promote action and risk taking (Anderson & Galinsky, 2006; Galinsky et al., 2003; Magee, Galinsky, & Gruenfeld, 2007).

A sense of power can be elicited by having people recall an experience with power (Galinsky et al., 2003). Power can also be generated through the principles of embodied cognition (Barsalou, 1999; Carney, Cuddy, & Yap, 2010). For instance, expansive versus constricted postures can generate the psychological and physiological experience of power (e.g., elevated testosterone level) and produce a variety of power-related thoughts and behavior (Carney et al., 2010; Huang, Galinsky, Gruenfeld, & Guillory, 2011; Park, Streamer, Huang, & Galinsky, 2013). Taken together, these findings suggest that contextual, psychological, and physical factors can all affect a sense of power and power-consistent cognition and behavior.

Music and Power

The current research explores the role of music in triggering the experience of power. Unlike powerful roles (i.e., being a manager), recalled power experiences, or even expansive postures, music does not appear to directly imply or signal power. Nevertheless, music has long been anecdotally associated with the psychological experience of power and power-related outcomes (Gabrielsson, 2010; Storr, 1992; Walser, 1993). Abraham Lincoln was known for instructing the Union army band to play Confederate tunes to signal the Federal government's power and dominance over Southern rebels (Donald, 2011). Gospel music is claimed to imbue its listeners with a strong sense of power (Cusic, 1990). Empirically, heavy metal and hip-hop music have been linked to increased dominance and aggression, factors associated with power (Chavez, 2008; Chen, Miller, Grube, & Waiters, 2006; Coyne, Stockdale, & Nelson, 2012; Fischer & Greitemeyer, 2006; Huh, 2011; Rubin, West, & Mitchell, 2001). In addition, neuroimaging research indicates that certain classical music (i.e., Mozart) is linked to left frontal activity (Habe & Jaušovec, 2003), a marker that correlates highly with approach tendencies (Keltner et al., 2003), and the experience of power (Boksem, Smolders, & De Cremer, 2012).

To date, the bulk of documentation linking music and power-related phenomena is correlational and subject to alternative explanations, such as the positive emotions that may result from music listening. Hence, this research empirically tests whether music has a direct and causal effect on power and its consequences. Beyond the anecdotes previously shared, two pieces of theory support the possibility that music could causally impact power. First, psychological experiences paired with music can be triggered by hearing the music (De Houwer, Thomas, & Baeyens, 2001). This conditioning effect suggests that some pieces of music may become associated with power and thus hearing the music would invoke a sense of power. Second, music might influence psychological processes through a contagion mechanism. In other domains, emotional contagion can occur through the human voice, in which people experience emotional states congruent to the emotions expressed in other people's voice (Neumann & Strack, 2000). Based on this finding, scholars have proposed that music can activate psychological experiences because listeners perceive certain experiential expressions in the music itself and subsequently mimic the same experiences internally (Juslin, 2008; Juslin, Liljestrom, Västfjäll, & Lundqvist, 2010). Thus, if some aspect of music conveys power, exposure to such music may influence the listener's own experience and produce a state of power.

Overview

Drawing from established methodologies in music research (Scherer & Zentner, 2001), we employed multiple experimental paradigms—self-reports, implicit measure, cognitive measure, and behavioral measure—to provide causal, convergent, and complementary evidence that music can elicit a sense of power and affect downstream cognition and behavior. Experiments 1–4 used pieces of music pretested to be high or low in power. Experiment 1 measured the implicit activation of power to obtain a measure of power that is less susceptible to experimenter or music demands. Experiments 2–4 demonstrated that a music-based sense of power can affect three important downstream cognition and behavior of power: abstract thinking (Smith & Trope, 2006), illusory control (Fast et al., 2009), and moving first (Galinsky et al., 2003; Magee et al., 2007). Importantly, Experiments 5a and 5b provided causal evidence for one particular aspect of music that can affect the experience of power: the level of bass. Both Experiments 5a and 5b demonstrated that music with more bass (measured in decibel, dB) can produce a greater sense of power than identical music with less bass.

The current studies also sought to rule out several alternative explanations for why music might affect power. First of all, we pretested and ruled out the effect of lyrics in Experiments 1–4 and demonstrated that the effect of music on power occurs over and above its lyrics. Experiments 5a and 5b used instrumental music to completely remove the potential effects of lyrics. In addition, research has shown that music can evoke a range of emotions (Juslin & Sloboda, 2010a). Because the experience of power can be associated with the experience of positive emotions (Keltner et al., 2003), we measured and controlled for positive emotions in our experiments.

Pretests

To investigate whether subjective feelings of power are affected by music, we selected and pretested 31 music pieces from several genres (i.e., sports music, heavy metal, punk, reggae, and hip-hop). Seventy-five undergraduates (27 males, $M_{age} = 19.86$, $SD = .93$) listened to 30-s musical excerpts and rated how powerful, dominant, and determined they felt using 7-point scales (from 1 = *not at all* to 7 = *very much so*; $\alpha s > .90$

in two pretests). The results revealed that the self-reported feelings of power varied between the music pieces heard.

We grouped the three highest rated music pieces as our *high-power music* prime and grouped the three lowest rated music pieces as our *low-power music* prime. Specifically, we selected the two highest rated pieces ($M = 4.99$, $SD = 1.38$) and the two lowest rated pieces ($M = 2.96$, $SD = 1.49$) of sports music, $t(44) = 9.07$, $p < .001$; we also selected the highest rated piece ($M = 4.22$, $SD = 1.82$) and the lowest rated piece ($M = 3.20$, $SD = 1.44$) of hip-hop music, $t(29) = 2.94$, $p < .001$ (see Appendix for music titles). Given that we matched the genres between the highest rated and the lowest rated music, we can rule out the potential effect of music genre.

Finally, we wanted to rule out the possibility that these differences in subjective feelings of power were driven by lyrics, as suggested in previous research (Greitemeyer, 2011; Rudman & Lee, 2002). To do so, 36 participants completed another pretest on the lyrics alone for the selected music pieces (10 males, $M_{age} = 21.97$, $SD = 7.77$). We found no difference in the power ratings ($\alpha s > .90$) between the three highest rated ($M = 2.32$, $SD = 1.47$) and the three lowest rated music pieces ($M = 2.27$, $SD = 1.55$), $t(35) = .27$, $p = .79$, suggesting music's influence on power could not be attributed to a mere semantic priming effect of lyrics.

Experiment 1: Implicit Activation of Power

Experiment 1 examined whether the pretested music would implicitly activate the construct of power, using a measure less susceptible to potential self-report biases (Scherer & Zentner, 2001; Västfjäll, 2010). In addition, we measured and controlled for positive emotions.

Participants and Design

Sixty-nine undergraduates (20 males, $M_{age} = 20.17$, $SD = 1.15$)[1] were randomly assigned to a high-power music or a low-power music condition.

Procedure

Participants completed the entire experiment while listening to music. Based on condition, participants listened to either the three *high-power* or the three *low-power* music pieces. The music pieces played repeatedly in the background at a comfortable level of volume.

Measures

Implicit activation of power. While listening to the "background" music, participants worked on a word-completion task used to measure the implicit activation of the power concept (Huang et al., 2011). These word fragments could be completed as either power-related words (e.g., power, control, direct, lead, rule, authority, command, etc.) or nonpower-related words. For instance, completing "p_ _e r" as *power* would result in a score of 1, whereas completing it as *paper* would be scored a 0. Participants completed all word fragments without skipping, and we counted the number of words completed as power-related words.

Positive emotions. Participants rated how happy, excited, and enthusiastic they felt at the moment (Fast et al., 2009).

Results and Discussion

Participants who listened to the high-power music generated significantly more power-related words ($M = 4.81$, $SD = 1.35$) than those who listened to the low-power music ($M = 3.92$, $SD = 1.92$), $F(1, 67) = 5.12$, $p = .03$, $\eta^2 = .07$. Importantly, music type did not produce any effect on positive emotions, $F(1, 67) = 2.20$, $p = .14$, and the effect of music type on implicit activation of power persisted after controlling for positive emotions, $F(1, 66) = 6.15$, $p = .02$, $\eta^2 = .09$.

This first experiment established a causal link from music pretested to be powerful to the implicit activation of power. Importantly, this effect of music was independent of positive emotions.

Experiment 2: Abstraction

Experiment 2 examined whether high-power music can lead to an important cognitive outcome of power—abstract thinking, the tendency to "see the forest instead of the trees" (Smith & Trope, 2006).

Participants and Design

Thirty-nine undergraduates (14 males, $M_{age} = 19.72$, $SD = 1.19$) were randomly assigned to a high-power music or a low-power music condition.

Procedure

We manipulated high-power versus low-power music listening experience with the same procedure from Experiment 1. We measured abstraction using the category inclusion task (Isen & Daubman, 1984) that has been shown to be influenced by power (Smith & Trope, 2006). Participants rated how prototypical exemplars were of a particular category (from 0 = *not at all* to 10 = *very prototypical*). Three exemplars were presented for each of the four categories, one strongly, one intermediately, and one weakly prototypical. Specifically, the four categories (with strong, intermediate, and weak exemplars) were vehicle (bus, airplane, and camel), vegetable (carrot, potato, and garlic), clothes (skirt, shoes, and handbag), and furniture (couch, lamp, and telephone). We presented the categories in random order, with all three exemplars in a particular category rated before the next category was presented. Inclusiveness ratings were aggregated separately for strong, intermediate, and weak exemplars.

Positive emotions. As in Experiment 1, participants completed the 3 items measuring positive emotions ($\alpha = .68$).

Results and Discussion

Following Isen and Daubman (1984) and Smith and Trope (2006), we conducted three separate analyses of variance for the weak, intermediate, and strong exemplars. Participants who listened to the high-power music rated the weak exemplars as more prototypical ($M = 5.40$, $SD = 1.69$) than low-power music participants did ($M = 4.30$, $SD = 1.28$), $F(1, 37) = 5.19$, $p = .03$, $\eta^2 = .12$; they also rated the intermediate exemplars as more prototypical ($M = 8.34$, $SD = 1.95$ vs. $M = 6.82$, $SD = 1.76$), $F(1, 37) = 6.54$, $p = .02$, $\eta^2 = .15$. The effect of music on the strong exemplars was not significant, $p = .44$. Following Isen and Daubman's original design of the task, strong exemplars are already very likely to be rated as members of specified categories, regardless of the primed state of participants. Hence, the fact that strong exemplars showed no differences between conditions is not surprising due to this likely ceiling effect (see also Huang et al., 2011).

Music type did not affect positive emotions, $F(1, 37) = 1.64$, $p = .21$, and the effect of music persisted after controlling for positive emotions for the weak, $F(1, 36) = 6.71$, $p = .01$, $\eta^2 = .16$, and intermediate exemplars, $F(1, 36) = 6.45$, $p = .02$, $\eta^2 = .15$. In sum, high-power music elevated individuals' construal level, as they saw the forest amid the trees.

Experiment 3: Illusory Control

Experiment 3 tested whether music can exert influence on another fundamental cognitive consequence of power—illusory control, the extent to which people perceive increased personal control over future events (Fast et al., 2009). Specifically, we hypothesized that listening to high-power music (vs. low-power music) should increase beliefs of personal control.

Participants and Design

Seventy-five undergraduates (24 males, $M_{age} = 20.28$, $SD = 1.42$) were randomly assigned to either a high-power music or a low-power music condition.

Procedure

Similar to the first two experiments, participants completed the entire study session while listening to music. To ensure participants experienced the music prior to encountering the dependent measure, they first completed a filler task in which they provided five statements to describe each of the two neutral images (i.e., a lamp and a desk).

Next, we measured illusory control following the die-rolling paradigm (Fast et al., 2009; Langer, 1975). Participants were instructed to imagine a situation in which they could earn an extra US$5 by correctly predicting the outcome of a six-sided die roll. They were then asked whether they would prefer to roll the die themselves or let the experimenter roll the die for them. Choosing to roll the die, as opposed to letting someone else roll it, reflects an illusory sense of control (Fast et al., 2009). It indicates that the participants believed they could personally influence the outcome of the random roll and increase the odds of winning the reward. We predicted that participants in the high-power music condition would be more likely to choose to roll the die than those in the low-power music condition.

Positive emotions. As in prior experiments, participants completed the 3 items measuring positive emotions ($\alpha = .83$).

Results and Discussion

Participants who listened to the high-power music chose to roll the die by themselves (86%) more often than the low-power music participants (59%), $\chi^2(1, N = 75) = 6.84$, $p = .01$, $\varphi = .30$. Music type did not affect positive emotions, $F(1, 73) = .15$, $p = .70$, and the effect of music prime persisted after controlling for positive emotions, $B = .74$, $SE = .29$, Wald $= 6.40$, $p = .01$, $R^2 = .14$.

Experiment 4: First Movers

Experiment 4 investigated whether music would affect participants' tendency to move first (Galinsky et al., 2003; Magee et al., 2007). We also explored whether music has a lingering effect on behavior even after the music has stopped playing, a phenomenon suggested in other auditory experiences research (e.g., speech; Stel, van Dijk, Smith, van Dijk, & Djalal, 2012).

Participants and Design

One hundred forty-eight undergraduates (50 males, $M_{age} = 19.95$, $SD = 1.54$) were randomly assigned to either a high-power music or a low-power music condition.

Procedure

Participants completed several ostensibly unrelated tasks. First, they were asked to help the experimenter beta test a newly constructed website that hosted an embedded music player. Participants clicked buttons on this website and listened to all three pieces of music from either the high-power or the low-power music condition through a headset. Unlike the previous experiments, participants only listened to each 1-min piece once (3 min in total) and in random order. They removed the headsets before proceeding to subsequent tasks.

Moving first. We measured participants' tendency to move first using a scenario from Magee, Galinsky, and Gruenfeld (2007). Participants were told they were part of a three-person debate team; because one teammate wanted to go first in the debate and one wanted to go second, it was up to participants to decide to go first or not. Participants were given a forced-choice question and decided whether they wanted to "go first" or "go second" in the debate.

Results and Discussion

Participants who listened to the high-power music selected to go first in the debate nearly twice as often (34%) as low-power music participants (20%), $\chi^2(1, N = 148)=3.43$, $p = .06$, $\varphi = .15$. Overall, listening to high-power music increased the propensity to move first. Importantly, this occurred even after music exposure was over and the amount of exposure was as short as 3 min.

Experiment 5a and 5b Overview

Our first four experiments demonstrated a direct causal link from music to power. Yet, it remains unclear what underlying factors may make some music produce more powerful feelings than others. Thus, in the last pair of the experiments, we explored one potential feature of music to account for its effect on power. We chose pieces of instrumental music that were novel to participants and systematically varied only the amount of bass in each of them. We chose to vary bass specifically because prior research suggests a link between bass and power. In particular, powerful people are more likely to speak with a deep, bass voice, and a bass voice is often associated with higher perceived power (Carney, Hall, & LeBeau, 2005; Hall, Coats, & LeBeau, 2005; Puts, Gaulin, & Verdolini, 2006; Puts, Hodges, Cárdenas, & Gaulin, 2007; Stel et al., 2012). Anecdotally, bass sound has also been suggested and employed extensively in the film industry to create perception and experience of power among audiences (Bordwell, 2001; Mott, 1990). Indeed, the solid bass voice and deep breathing sound produced by James Earl Jones as Darth Vader in the Star Wars movie series has remained one of the most iconic theatric demonstrations of power (Schmidt, 2011). Given this plausible association between bass and power, we adopted different novel instrumental music pieces in the last two experiments and digitally altered the bass levels (dB) of each music piece to make notable differences. We then tested whether different levels of bass in music would influence listeners' feelings of power.

Experiment 5a: Music Bass and Explicit Sense of Power

Experiment 5a tested whether music with different levels of bass can influence explicit, self-reported feelings of power. To hold all other music qualities and characteristics constant and ensure bass level was the only causal variable that could influence people's self-reported feelings of power, we used one music piece and varied only its bass levels. We predicted that listening to the *heavy-bass version* would produce more self-reported feelings of power than listening to the *light-bass version*.

Participants

Sixty-eight undergraduates (26 males, $M_{age} = 19.82$, $SD = 2.59$) were randomly assigned to either a heavy-bass music or a light-bass music condition. No participant reported having heard the music piece prior to the study.

Procedure

Participants were told they would listen to a music piece selected by the computer and would answer some questions afterward. Participants clicked the play button on the computer screen and listened to one piece of music. We selected a generic instrumental music piece and digitally modified it to vary only in the bass level. In the *heavy-bass condition*, the bass was set to +15 dB and in the *light-bass condition*, the bass was set to −15 dB. The volume of the headset was set to a fixed level (50%) and participants were instructed not to change the volume of the headset throughout the experiment. The music piece lasted for 2 min and participants only listened to the piece once.

Explicit feelings of power. Participants rated how powerful, dominant, and determined they felt using 7-point scales (1 = *not at all*, 7 = *very much so*; $\alpha = .92$).

Positive emotions. Similar to prior experiments, participants completed the 3 items (happy, excited, and enthusiastic) measuring positive emotions ($\alpha = .93$; Fast et al., 2009).

Results and Discussion

Participants who listened to the heavy-bass music reported greater feelings of power ($M = 6.06$, $SD = 1.23$) than those who listened to the light-bass music ($M = 5.15$, $SD = 1.63$), $F(1, 66) = 6.74$, $p = .01$, $\eta^2 = .09$. Importantly, the amount of bass did not produce any effect on positive emotions, $F(1, 66) = .00$, $p = .97$. The effect of bass on self-reported feelings of power persisted after controlling for positive emotions, $F(1, 65) = 7.54$, $p = .01$, $\eta^2 = .10$.

Experiment 5b: Music Bass and Implicit Sense of Power

To ensure the bass effect was robust and not subject to demand characteristics or social desirability concerns, we further tested the effect of music bass on implicit sense of power in Experiment 5b. We made two additional changes to generalize the results of Experiment 5a. First, we selected a new piece of instrumental music to test whether the effect found in Experiment 5a would generalize to a new piece of music. Second, we used different heavy and light bass parameters to show that the effects are not isolated to specific bass configurations.

Participants

Fifty-two undergraduates (16 males, $M_{age} = 20.54$, $SD = 1.13$) participated in the experiment. Eight participants did not follow the procedure to listen to the background music while completing the tasks; hence, the final analyses were conducted using the data from the remaining 44 participants (15 males, $M_{age} = 20.52$, $SD = 1.11$). None of the participants reported any prior exposure to the music piece.

Procedure

Participants completed the entire experiment while listening to music. The music played repeatedly in the background at a fixed level of volume from the headset (50%); participants were instructed not to change the volume of their headset during the study. In the *heavy-bass condition*, the bass was set to +3 dB and in the *light-bass condition* the bass was set to −20 dB.

Implicit activation of power. While listening to the "background" music, participants worked on the same word-completion task used to measure the implicit activation of the power concept in Experiment 1.

Positive emotions. Participants rated how happy, excited, and enthusiastic they felt at the moment ($\alpha = .87$).

Results and Discussion

Participants who listened to the heavy-bass music generated more power-related words ($M = 5.43$, $SD = 1.50$) than those who listened to the light-bass music ($M = 4.52$, $SD = 1.44$), $F(1, 42) = 4.21$, $p = .046$, $\eta^2 = .09$. Importantly, the amount of bass did not produce any effect on positive emotions, $F(1, 42) = .45$, $p = .51$, and the effect of bass amount on implicit activation of power persisted after controlling for positive emotions, $F(1, 41) = 4.40$, $p = .04$, $\eta^2 = .10$. Across Experiments 5a and 5b, heavy-bass music significantly generated more feelings of explicit and implicit power compared to light-bass music. Importantly, these effects of music bass were independent of positive emotions.

General Discussion

Six experiments provided consistent support for our hypotheses that music has systematic effects on listeners' power-related cognition and behavior. Music pretested to create subjective feelings of power implicitly activated the construct of power (Experiment 1). This music also systematically generated three important downstream consequences of power: abstract thinking (Experiment 2), illusory control (Experiment 3), and moving first (Experiment 4). Importantly, the demonstrated effects went beyond (a) the influence of lyrics and (b) the influence of positive emotions. Furthermore, these effects occurred both while music was being listened to when completing the dependent variables and after the music had stopped playing. Finally, while the music in Experiments 1–4 may differ on a number of dimensions, Experiments 5a and 5b varied only in one feature of music—its level of bass.

The current research contributes to the literature in several ways. First, our findings support the emerging notion that music can induce various psychological experiences other than emotions (Gabrielsson, 2010; Juslin & Sloboda, 2010b). Importantly, we ruled out positive emotions as an alternative explanation for the current findings, suggesting music's effects on power can occur independent of its effects on emotions. Second, the current investigation is the first to establish causality between music and power. Not only did we confirm that certain music makes people feel more powerful than other music, we established the capability of music to activate the concept of power implicitly and promote power-related cognition and behavior.

Third, our research suggests that, in addition to experiencing power through hierarchical roles, psychological priming, and bodily postures (for a review, see Galinsky et al., 2014), an effective and convenient way to activate power is to expose oneself to high-power music. More broadly, the ubiquitous nature of music in society makes it a potentially effective medium for inducing power, likely without listeners' conscious awareness. This feature may also allow music to serve as an effective power manipulation that minimizes suspicion and demand characteristics in future research.

Although the current research established a causal link between music- and power-related cognition and behavior, several questions still remain and require further research in the future. First, we demonstrated that the effect of music was not produced by lyrics alone, which suggests the effect of music is beyond a mere semantic priming effect. Although we also demonstrated that bass level is one essential feature of music that produces feelings of power, future research can identify other characteristics in music that potentially produce an increased sense of power.

In addition, Juslin, Liljestrom, Västfjäll, and Lundqvist (2010) have theorized multiple mechanisms accounting for music's effect to generate psychological experiences. Among them, we propose that conditioning and contagion are two potential mechanisms by which music can make people feel more powerful. The conditioning hypothesis suggests that powerful experiences are triggered by certain music because these experiences are often paired with that music (De Houwer et al., 2001). For instance, sports music may trigger the experience of power because it is usually paired with competitive events that are associated with power, rewards, and winning. Alternatively, the contagion hypothesis suggests that people can hear specific music components that express a sense of power and mimic these feelings internally (Juslin et al., 2010; Juslin & Västfjäll, 2008; Neumann & Strack, 2000). Supporting this hypothesis, Experiments 5a and 5b demonstrated that varying the amount of bass expressed in music can systematically lead to different degrees of powerful feelings. Because we matched the genre of the music primes used in our experiments, it suggests that the effect of high-power music may be more than just a result of simple conditioning between musical genres and the experience of power. Importantly, our findings only identify specific features of music and do not preclude other mechanisms from working simultaneously; hence, future research can investigate other possible routes through which music exerts its influence on a sense of power.

Finally, recent neuroimaging research has started to identify brain regions that show elevated activities while listening to music (Blood & Zatorre, 2001; Salimpoor et al., 2013). Past research has also suggested that the experience of power is linked to the activation of specific areas of the brain (Boksem

et al., 2012). Future research can investigate whether the same regions of the brain that activate in the experience of power may also activate while listening to high-power music.

The English novelist George Eliot claimed that music infused strength into her limbs and ideas into her brain. The effect of music appears to manifest itself not only in its ability to entertain but also in the ability to imbue humans with a real sense of power, both in their limbs and in their minds.

Appendix

Music Titles

High-power music pieces:

1. We Will Rock You (Queen)
2. Get Ready for This (2 Unlimited)
3. In Da Club (50 Cent)

Low-power music pieces:

1. Because We Can (Fatboy Slim)
2. Who Let the Dogs Out (Baha Men)
3. Big Poppa (Notorious B.I.G.)

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Note

1. Previous research has shown that music perceptions do not differ by gender (Kratus, 1993; Robazza, Macaluso, & D'urso, 1994). Across experiments, participant gender did not produce any meaningful effect and hence is not discussed further.

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