

LOYOLA UNIVERSITY CHICAGO

MUSIC AND AGGRESSION:  
EFFECTS OF LYRICS AND BACKGROUND  
MUSIC ON AGGRESSIVE BEHAVIOR

A THESIS SUBMITTED TO  
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MASTER OF ARTS

PROGRAM IN APPLIED SOCIAL PSYCHOLOGY

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For Jillian, Phoebe, Francine, and Oliver.

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## ABSTRACT

Given the ever-growing popularity of music in daily life, it is of the utmost importance to understand how it influences affect, cognition, and behavior, especially given the violence of certain genres of music. The present study was designed to investigate the relationship between music and behavior, specifically to examine how the lyrics and background music interact to influence affective hostility and aggressive behavior. Data were collected from a sample of 168 students (61% Female;  $M_{\text{Age}} = 19.24$ ,  $SD = 2.470$ ) at a large, private, Midwestern university to investigate this relationship. The music was manipulated by randomly assigning the participant to listen to one of four versions of a song. These versions included the match of either antisocial or prosocial lyrics with heavy metal or calm background music. Although there was no significant main effect of the lyrical content on participant's aggressive behavior as hypothesized, there was a significant main effect of the lyrical content on an individual's level of affective hostility  $F(4,159) = 8.818$ ,  $p < .001$ ,  $\eta^2 = .186$ . Specifically, pairwise comparisons showed antisocial lyrics resulted in a higher level of hostility as compared to the prosocial lyrics. This pattern suggests that music influences an individual's affective hostility, but counter to previous research, music does not necessarily alter aggressive behavior. The relationship between music and aggression requires further investigation in order to determine whether music does in fact influence behavior, including potential moderators of this relationship.

## CHAPTER I

### INTRODUCTION

In 2013, over 1.1 million violent crimes were reported in the United States (Federal Bureau of Investigation, 2014). The FBI defines “violent crimes” as incidents involving the use of force or threat of force against an individual. Such crimes include the following four offenses: murder and non-negligent manslaughter, rape, robbery, and aggravated assault (Federal Bureau of Investigation, 2014). Similarly, aggression is defined as any behavior directed toward another individual carried out with the intent to cause harm, either physically or psychologically (Anderson & Bushman, 2002). Based on this definition, one may conclude that aggression may be a powerful factor in the decision to engage in a violent crime. Two critical questions concern what causes a person to act aggressively and what types of individual and situational factors play into the astonishing number of violent crimes that occur each year. The present study investigates factors that cause a person to act aggressively in a given situation.

#### Theoretical Models of Aggression

Aggression can be viewed as a predominant force behind violent acts that happen throughout the world. Aggression can be a predisposition to behave aggressively (i.e., trait aggression), or it can be a situationally-evoked behavior that occurs at a specific time and place (i.e., state aggression). Trait and state aggression intertwine in understanding

human thoughts, feelings, and behavior in relation to aggression. For example, in order to understand a person's level of aggression in a specific situation, one must consider both state and trait aggression. Bushman (1995) presented evidence of an interaction between level of dispositional aggression and experimental stimuli, such that people who are high in dispositional aggression will react more aggressively to aggression provoking stimuli, compared to those who are lower in dispositional aggression.

Psychologists have developed a variety of theoretical models to explain how genetics, personality, and situational factors relate to both trait and state aggression. Two such conceptual frameworks are the Catalyst Model and the General Aggression Model. The Catalyst Model, on the one hand, focuses on how genetic and upbringing factors affect the predisposition and motivation to act aggressively. The General Aggression Model, on the other hand, adopts a social learning perspective, which considers both predispositions as well as situational factors as determinants of whether or not people will behave aggressively. These two theoretical models will now be discussed and contrasted in further detail with respect to how each model explains the processes through which music influences human aggression.

### **Catalyst Model**

Among the more recent models of aggression is the Catalyst Model (Ferguson et al., 2008; *Figure 1*). This model adopts an evolutionary perspective in explaining the psychological processes underlying aggression. A central tenet of the Catalyst Model is that genetic predispositions, such as sex and upbringing (e.g., family violence exposure), can lead to an aggressive personality which can produce violent behavior. Previous research has shown that family life can strongly influence aggression (Fikkers,

Piotrowski, Weeda, Vossen, & Valkenburg, 2013; Lee & Hoaken, 2007). Sex differences in aggression are consistently supported by research documenting that males typically are more physically aggressive than females (Golin & Romanowski, 1977; Lawrence & Hutchinson, 2014). However, merely having an aggressive personality does not necessarily mean one will act violently. Thus, according to the Catalyst Model, in order for one to behave violently, there must be an external motivation for violence.

The first route to aggressive behavior in the Catalyst Model is through a motivational stimulus or “catalyst.” This catalyst serves to motivate an individual to engage in aggressive behavior through environmental strain (Ferguson et al., 2008). Environmental strain may take the form of either social or economic problems, such as discrimination, unemployment, or poverty. Previous research has found a relationship between environmental strain, aggression, and related conduct problems (Booth & Zhang, 1996). Booth and Zhang’s finding supports the ideas that environmental strain is strongly related to aggression in adolescents and adolescent levels of aggression are strongly predictive of adult aggressive behavior (Johnson, Cohen, Smailes, Kasen, & Brook, 2002). Motivation is the prominent factor that determines whether or not someone will engage in a violent behavior, but it does not determine specifically how one will behave. Motivation determines the why but the other route of violent behavior determines the how.

In addition to the mechanism through which motivational catalysts influences aggression, the second important route to aggressive behavior is through violent cognitions. Someone who has a more aggressive personality may have more violent cognitions, as compared to someone who has a less aggressive personality. These violent

cognitions may then be further strengthened through exposure to violent media or peer exposure, which may provide concrete examples of how to act out such cognitions. Contrary to the General Aggression Model (see below), this particular pathway toward aggression does not affect whether or not a violent behavior occurs as much as it influences the ways in which people act out violent behavior. For example, if someone watches an action movie where the main character goes on a rampage with a machine gun, this does not mean that the viewer is going to go buy a machine gun and start shooting people at a school. However, if this individual feels marginalized at school, then that perceived marginalization could serve as a motivational catalyst, which might provoke the individual into attacking teachers or classmates. Furthermore, having watched the action movie earlier, this individual may choose to use a machine gun as opposed to a different type of gun or weapon. The choice in weapon is due to a stylistic catalyst, such that watching the action movie with machine guns will shape how the aggressive behavior manifests. A stylistic catalyst lends more to influence the type of violent behavior as opposed to a motivation of why an individual performs a behavior. The Catalyst Model provides a strong theoretical explanation for what determines both the cause of aggressive behavior as well as the form through which this aggression is expressed.

Although the Catalyst Model of aggression takes into account the implications of trait aggression through genetic predisposition and upbringing, the model's theoretical framework has some major flaws. One major problem with this model is that it does not address the influence of the person's internal state (e.g., affect, cognition, and arousal), which numerous studies have shown influence aggression (Anderson, Carnagey, &

Eubanks, 2003; Lee & Hoaken, 2007; Pieschl & Fegers, 2015). Another flaw in the Catalyst Model is that it ignores the individual's decision process in choosing whether or not to act aggressively. Just because a catalyst, such as an environmental strain, exists does not mean that a person is necessarily going to engage in a violent behavior. For example, not every single homeless person commits violent crimes because they lack money or a place to live. An alternative conceptual framework, known as the General Aggression Model, addresses the flaws in the Catalyst Model and provides a better understanding of the psychological processes underlying aggression.

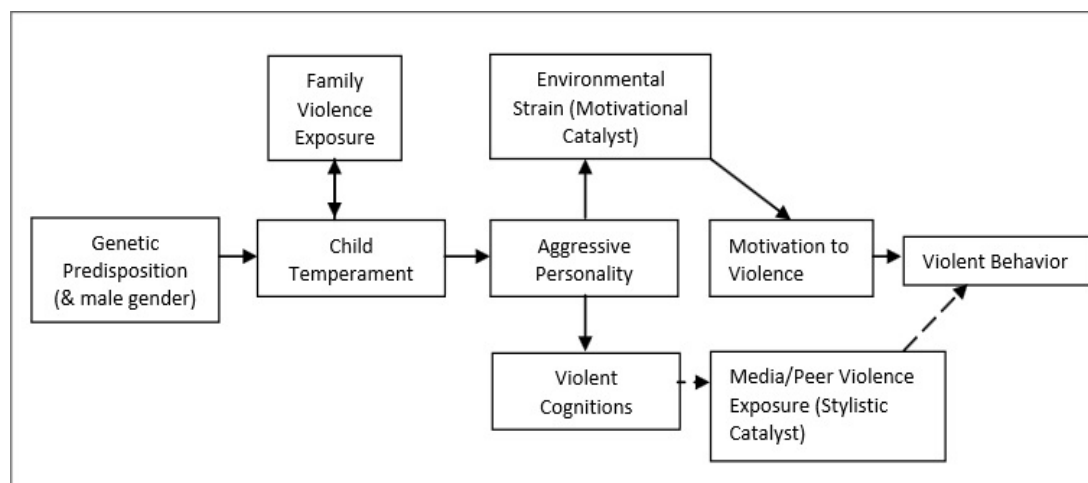


Figure 1. Catalyst Model of Aggression

### General Aggression Model

Another major model of aggression, which some researchers have called the quintessential model, is the General Aggression Model (GAM; Anderson & Bushman, 2002). Although this particular model adopts a social learning perspective, as opposed to the evolutionary perspective of the Catalyst Model, the GAM nevertheless incorporates person-centered features, as does the Catalyst Model. As seen in *Figure 2*, the GAM assumes three major stages of aggression involving the input, route, and final outcome

that determine whether people will engage in aggressive behavior. Each of these three stages of input, route, and final outcome plays an integral role in whether or not individuals will engage in aggression.

The first stage of the General Aggression Model is the input stage, which includes situational and person-centered factors. This particular stage considers both predispositions to be aggressive (i.e., trait aggression) as well as situational factors that may affect the decision to act aggressively. Similar to the Catalyst Model, the GAM considers the individual's personal features, which can include personality and genetic predispositions. The GAM is superior to the Catalyst Model because the former model includes situational factors, which previous research has shown can have substantial influence on aggression (Bartholow, Anderson, Carnagey, Benjamin Jr., 2005).

The second stage of aggression the GAM focuses on the internal state of the person. The internal state is the route by which the person comes to the appraisal of the stimulus inputs (Anderson & Bushman, 2002). According to the model, three different internal routes have been shown to correlate with increased aggressive behavior. These documented routes of influence include affect, arousal, and cognition. Prior research has shown that affect can influence behavior in a variety of different positive (Greitemeyer, 2011) and negative (Berkowitz, Geen, & Donnerstein, 1998) ways. The present study will exclusively focus on affect as an underlying psychological mechanisms, as affect has been shown to have a strong connection to aggressive behavior in past research similar to the present study (Brummart-Lennings & Warburton, 2011; Pieschl & Fegers, 2015).

The final conceptual stage of the GAM concerns the output, which is a result of the inputs (both person-centered and situational) and the internal state (see *Figure 2* and

*Figure 3*, which is a conceptual expansion of *Figure 2*). The outcome can take the form of either an impulsive or thoughtful action. The particular form that the outcome takes depends on whether or not the person has sufficient cognitive resources available to engage in a thoughtful action. Cognitive resources can be depleted for a variety of reasons, including inattention or the influence of drugs or alcohol. Previous research has found that people act more aggressively when under the influence of drugs or alcohol (Bushman & Cooper, 1990). The results of the Bushman and Cooper (1990) study supports the idea that people are more likely to engage in impulsive actions, such as aggression, when they have fewer cognitive resources available. If cognitive resources are sufficient, then the individual must decide if the initial impulsive behavioral outcome is important and satisfying to the individual. If the outcome of the impulsive behavior is not important or if it satisfies the individual, then the initial impulsive action will be performed and no further cognitive resources will be used. On the other hand, if an individual does evaluate the outcome as important or is unsatisfying, then reappraisal of the individual's person centered and situational inputs and internal state will occur in order to engage in a more thoughtful action. If the behavioral outcome is important and the individual possesses sufficient cognitive resources, multiple reappraisals may occur before thoughtful action occurs. Although the GAM may be conceived as the quintessential model of aggression, it nevertheless contains some conceptual flaws. For instance, the GAM, unlike the Catalyst Model, does not deconstruct "person" input into specific individual factors, such as genetic predispositions versus upbringing, which may each affect individuals very differently. Another flaw in the GAM is that it does not differentiate between which person and situational factors play the most substantial role



in the final outcome of whether to engage in an aggression. Although imperfect, the GAM serves as a more solid theoretical foundation, compared to the Catalyst Model, for the present study.

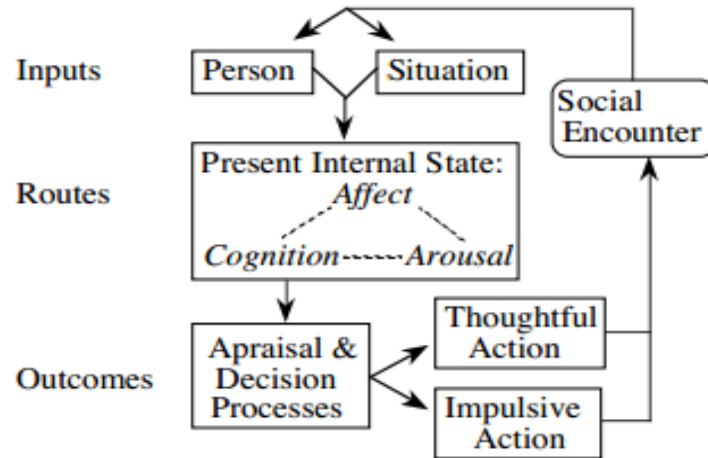


Figure 2. General Aggression Model (GAM)

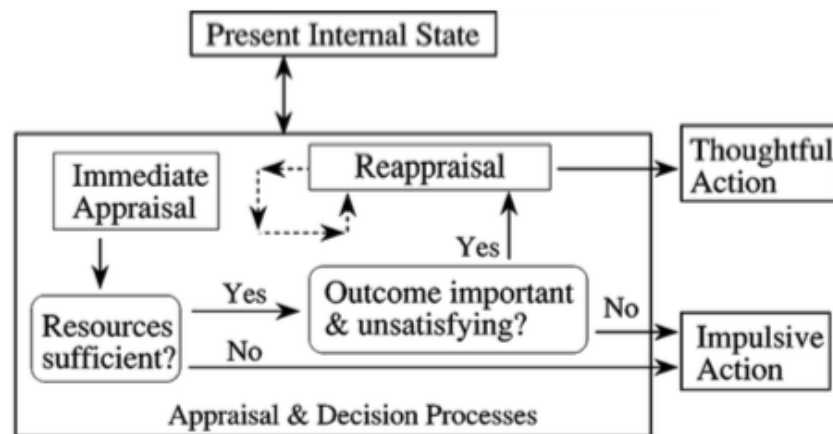


Figure 3. General Aggression Model: Outcome Expanded

As discussed above, according to the GAM, affect is one of the internal states that can influence an individual's appraisal of a situation and whether aggression is necessary. A change in internal state can be influenced by the person (e.g., a personality trait), the

situation (e.g., violent music), or by other internal states (e.g., cognition and arousal).

The consequences of negative affect on aggression have been previously studied and shown to be correlated with increases in aggression (Berkowitz, Geen, & Donnerstein, 1998). The further understanding of how aggression manifests in an individual and how this manifestation is influenced by situational inputs is of the utmost importance due to the integral role the situation plays in the GAM. The present study will examine how exposure to media, specifically exposure to violent music, influences the affective route in the manifestation of aggressive behavior.

### **Comparison of the Catalyst and GAM Models**

Both the Catalyst Model and the GAM offer a relatively thorough theoretical explanation of the underlying mechanisms behind aggression. Although these two theoretical models are similar in some respects, they largely diverge in terms of the psychological processes assumed to cause people to act aggressively. Each model holds its own place in the literature, but for the purpose of the present study, the GAM is a more comprehensive theoretical model that converges more fully with the present research hypotheses. Both of these models are similar in that they encompass both person-centered predispositions as well as situational factors as causal routes for aggression. On the other hand, these two models diverge in terms of their explanations of the roles these factors play and how aggression manifests itself within individuals.

Both situational and person-centered factors are very important in understanding how a person will respond behaviorally in a given situation. However, these two factors play different roles in the Catalyst and GAM models. For example, both models contend that violent media can influence how a person will act albeit in very different ways. In

the Catalyst Model, exposure to violent media is more influential in determining *how* a person will act violently, whereas in the GAM the same exposure to violent media plays a role in *why* a person will act violently. Another difference between these two theoretical models is in their incorporation of cognitive resources. The Catalyst Model, on the one hand, does not consider cognitive resources at all and merely focuses on motivational components. The GAM, on the other hand, uses cognitive resources as a determinant of the type of outcome in which a person engages (i.e., thoughtful or impulsive). A final major difference between these models is the role of motivation in explaining aggressive behavior. In the Catalyst Model, one must be motivated in order to engage in a violent behavior, while in the GAM model, violent behavior depends on how that person is feeling internally and how the individual appraises that present internal state. Motivation does not explicitly come into play in the GAM until the output and decision to reappraise or engage in the impulsive action, whereas the Catalyst Model frames motivation as an input to whether or not the person will act violently. Although these two models vary in their explanation, both hold a strong place in their respective literatures--social learning for the GAM, and evolutionary for the Catalyst Model.

#### Person-Centered Factors of Aggression

Person-centered factors are characteristics of a person that influence how that individual may act or perceive a given situation. The present study will focus on two predominant person-centered factors: personality traits and genetic predispositions. An important commonality among these two factors is their temporal stability, meaning that the two factors remain consistent across time and situations (Anderson & Bushman, 2002). The first focus of the present study is on personality traits, or how a person thinks,

feels, or behaves across situations. In the aggression literature, certain personality traits, such as hostility, anger, and aggressiveness, are considered to predispose individuals to higher levels of aggression compared to other individuals who lack these personality traits (Anderson & Bushman, 2002). By measuring these different constructs, researchers can shed light on how a particular person may behave in response to certain situational factors.

### Genetic Predispositions Toward Aggression

Although it is important to consider personality traits when studying aggression, other person-centered predispositions (e.g., genetics) can determine how an individual will respond to a given situation. Among the most heavily studied genetic predispositions is sex. Previous research has shown that males are, on average, more physically aggressive than females (Campbell, 2006). The present study will further examine this sex differences, specifically in terms of how males and females differ when exposed to violent music. Although aggressive predispositions and sex are important in determining whether someone will respond aggressively, the interactive combination of these multiple factors can shed additional light on how a person will respond to a given situation.

### Situational Factors of Aggression

Most social psychologists agree that the situation is a very powerful determinant of thoughts, feelings, and behavior. Behaviors are not simply hardwired into DNA. A variety of different situational factors, including provocation, incentives, and cues, all

contribute to determining behavior. One of the most influential causes of aggressive behavior is provocation (Berkowitz, 1993). That is, aggressively prodding or pressuring an individual with the intention of eliciting an aggressive reaction is a power cause of aggressive behavior. Provocation takes many different forms, including verbal aggression, physical aggression, and interference with a personal goal (Anderson & Bushman, 2002). Just as one can be provoked to act aggressively one can also be incentivized to act aggressively. Incentives can promote both positive behavior (e.g., helping) as well as negative behavior (e.g., aggression). An incentive may be either predetermined (e.g., a perceived cost/benefit ratio) or more spontaneous (e.g., money left on a table) (Anderson & Bushman, 2002).

On the other hand, situational cues can also influence aggression. The present study focuses on aggressive cues, which are objects that may prime aggression-related concepts in memory (Anderson & Bushman, 2002). These situational cues may range from something as serious as watching a violent act unfold immediately in front of you (e.g., a shooting) to something as mundane as listening to a song with antisocial lyrics. The relationship between aggressive cues and the behavior that follows is important to investigate because these cues may take many different forms, and it may be more or less apparent what type of influence these cues have on thoughts, feelings, and behaviors.

### Importance of Music in Daily Life

From adolescence to late adulthood, music is an extensive part of everyday life for many people. Music is prevalent in nearly every aspect of daily life, be it working out

at the gym, grocery shopping, or even watching TV. For instance, the average American college student listens to over 4 hours of music per day (Rubin, West, & Mitchell, 2001). Given the magnitude of the importance that music plays in daily life, the influence it may have on an individual's affective, cognitive, and arousal state must be further understood. Specifically, given the range of musical styles an individual may listen to, one must carefully consider the particular content and style of music when studying the influence of music.

Music is more than merely a distraction while sitting on the bus. People use music for a variety of different reasons. From getting pumped up at the gym to relaxing before bed, music may serve many different instrumental purposes. The music that people use for each of these situations may greatly vary. In some instances, this music may actually be very violent and aggressive. For instance, here is a snippet of lyrics from a song by a popular contemporary band: "Maybe it's just bullshit and I should play God, and shoot you myself. Because I'm tired of waiting" (Tool, 1992). One can clearly see that these lyrics are aggressive, angry, and hurtful. Given the immeasurable amount of daily exposure people have to music, it is very important to understand the psychological effect this exposure is having on individuals. Investigating the processes through which music affects aggressive behavior can potentially clarify the role music plays in human aggression. A better understanding of the role music plays in aggression could have a considerable impact on the music industry and the types of music to which people choose to listen. A better understanding of the psychological effects of music is important because such knowledge may teach us how to reduce aggression in the future while simultaneously allowing us to enjoy its benefits.

## The Impact of Music on Aggression

Media, whether it be TV, music, or video games, can have a significant impact on how a person thinks, feels, and behaves. Many published studies have noted the relationship—both positive and negative—between media and aggression. Indeed, there is overwhelming empirical evidence that violent media has a negative effect on people, as violent media is correlated with increased aggressive thoughts, feelings, and behaviors (Bushman & Huesmann, 2014).

Over the past few decades, music has become more popular and more accessible through technological advances, such as MP3 players. As discussed above, music has been shown to have both positive and negative psychological effects on people. Some of the negative effects of music that research has found include increased sexual violence (Fischer & Greitemeyer, 2006), bullying (Zimmerman, Glew, Christakis, & Katon, 2005), and overall increased aggressive thoughts (Anderson, 1997; Anderson, Carnagey, & Eubanks, 2003), aggressive feelings (Pieschl & Fegers, 2015; Stanger, Kavussanu, & Ring, 2012), and aggressive behaviors (Brummert-Lennings & Warburton, 2011; Coyne & Padilla-Walker, 2015). On the other hand, recent research has also shown that music can have positive effects, such as decreasing aggressive cognitions, affect, and behavior (Greitemeyer, 2011; Sharman & Dingle, 2015). One major issue with previous research concerns the stimuli presented in the studies. All of the studies mentioned previously used publically available music as stimuli in their experiments. However, using publically available music may produce bias in observed results for two major reasons. First, people who have heard an aggressive song may respond differently to it, compared to people who have never heard this particular song before. For this reason, it is

important to hold prior exposure to the musical stimuli constant across all participants. A second problem with using publically available music as experimental stimuli is that if people have heard the particular song before, there may be a positive or negative memory connected with that song, which could lead the song to influence them differently than it would people who have never heard the song before. These potential individual differences can be controlled by using stimuli to which participants could not possibly have been previously exposed. Overall, it is important to understand the relationship between music and aggression as the popularity of music increases every year as music festivals keep popping up, technology further advances, and music generally becomes more accessible to the public.

As previously discussed, music can have profound implications on thoughts, feelings, and behaviors. When referencing back to each of the two previously discussed models of aggression, music easily fits into each model. For instance, in the Catalyst Model, music can act as a stylistic catalyst, influencing violent behavior as an outcome. On the other hand, in the GAM, music can be included as a situational factor in the input; therefore, music may influence affect, cognition, and arousal, which can lead to an outcome of engaging in violent behavior. Although the models diverge in the process by which music enters the model and how this music is processed, both models do in fact converge in their implications for aggressive behavior. In both models, the anticipated outcome is an increase in aggression or in the likelihood to act aggressively based upon exposure to violent music. Thus, because behaving aggressively may result in negative consequences, music must be further studied to understand the influence that it can have on aggressive behavior.



### Research Question

The present study investigated the impact of music on resulting behavior. Specifically, how exposure to violent music may influence aggressive behavior. In order to investigate the independent influence of both the lyrical content and the background music, four versions of a song were used. Two versions of background music (heavy metal background music vs. calm background music) and two versions of lyrical content (antisocial lyrics vs. prosocial lyrics) were paired in order to see how each component influences an individual's level of aggression. Thus, there was one song with heavy metal background music and antisocial lyrics, one song with heavy metal background music and prosocial lyrics, one song with calm background music and antisocial lyrics, and one song with calm background music and prosocial lyrics. The present study also explored the role of affect as psychological mechanisms in the relationship between music and aggressive behavior. The specific hypotheses for the present study are as follows:

- (1) A main effect of lyrical content will exist, such that participants who are exposed to antisocial lyrics will exhibit more aggressive behavior than will participants who are exposed to prosocial lyrics.
- (2) The lyrical content will interact with style of background music, such that when participants are exposed to antisocial lyrics paired with calm background music, they will exhibit more aggressive behavior than in any other experimental condition.
- (3) Affect will mediate the relationship between the song and level of aggression, such that antisocial lyrics will predict an increase in negative affect (i.e., hostility), which in turn will predict an increase in the level of aggression.

## CHAPTER II

### METHOD

#### Pilot Study

Prior to the present study, a pilot study was conducted in order to ensure the stimuli being used in the present study did in fact increase participants' level of aggression above and beyond a control group. It was hypothesized that the violent music would increase level of aggression as measured using the Hot Sauce Paradigm (Lieberman, Solomon, Greenberg, & McGregor, 1999). The Hot Sauce Paradigm conceptualizes aggression as the amount, in grams, the participant allocates to another random person to consume. This is considered an aggressive act because the participant is explicitly told that the person in which they are pouring the hot sauce sample for strongly dislikes hot and spicy food. Previous research has found this to be a valid measure of aggressive behavior (Brummert-Lennings & Warburton, 2011). For the purpose of the pilot study, only two experimental conditions were used: a no-song control, and the version of the song with antisocial lyrics and heavy metal background. The pilot study recruited 62 undergraduates (72% female,  $M_{\text{age}} = 19.20$  years;  $SD_{\text{age}} = 1.157$  years; 46.2% white, 6.2% African-American, 12.3% Hispanic, 3.1% Native American, 21.5% Asian, and 4.6% Multiple Races/Other), all of whom were students in an introductory psychology class at Loyola University Chicago. The effectiveness of the

music in increasing aggression was analyzed using a one-way ANOVA controlling for both sex and trait aggression. The ANOVA to test the hypothesis was significant,  $F(1,58) = 10.478, p = .002, \eta^2 = .163$ . Further investigation of the group means demonstrated that the hypothesis was supported, such that the participants exposed to the violent music responded more aggressively to the Hot Sauce Paradigm than the control group. Based on this pilot study, it was concluded that the music would be used in the present study. Another change made to the present study based on the pilot study was the dependent measure used. Because the Hot Sauce Paradigm was found to be too time consuming, a shorter, well validated, alternative measure—the Tangram Help-Hurt Task (THHT; Saleem, Anderson, & Barlett, 2015)—was used for the present study.

### Participants

The present study recruited 168 university students (61% female,  $M_{\text{age}} = 19.24$  years;  $SD_{\text{age}} = 2.470$  years; 41.7% white, 4.8% African-American, 15.5% Hispanic, 30.4% Asian, and 6.5% Multiple Races/Other), all of whom were undergraduates registered in an introductory psychology class at Loyola University Chicago. Each participant was randomly assigned to one of five groups in a 2 (antisocial lyrics versus prosocial lyrics)  $\times$  2 (heavy metal background versus calm background music) between-subject factorial design with a separate control group who was not assigned to listen to any song. This control group provided baseline data for aggressive responding. The number of participants required was obtained using a power analysis. Specifically, a total of 140 participants were required in order to have 80% power to detect (at two-tailed  $p < .05$ ) a medium-sized main effect of violent music on aggression using an analysis of variance (ANOVA). Twenty-six additional participants (19% more than the required 140)

were included in case some participants had to be excluded from analyses due to failure to attend to the experimental materials.

### Measures & Procedure

The study used a paper-and-pencil survey composed of six parts that were administered in the lab. A lab setting, as opposed to an online survey, was chosen in order to ensure that there were no outside distractions for the participants. Once informed consent was obtained, participants began the first part of the study.

#### **Part 1: Music Exposure and Tangram Help-Hurt Task (THHT)**

In order to ensure that participants did not become aware of the hypotheses being tested, the study was described as investigating two different constructs: problem solving skills and the relationship between music and information processing style. The state aggression of the participant after being exposed to one of the songs was measured using the THHT (Appendix A; Saleem, Anderson, & Barlett, 2015), which consists of two parts. Participants first completed 11 tangram puzzles and they were told their performance on these puzzles was being timed. Once they completed the puzzles, participants were told they were then moving on to the second unrelated portion of the study. This portion entailed privately listening to a song on the provided MP3 player with headphones. After participants listened to the song to which they had been randomly assigned, the experimenter told the participants that the experimenter had forgotten to give them one of the forms from the first portion of the study, and asked them to fill it out. This “forgotten” form instructed participants to pick 11 tangram puzzles from a selection of 30 puzzles (10 easy, 10 of medium difficulty, and 10 hard) that they were told another participant would have to attempt to complete in under 10

minutes to try to receive a prize. This particular puzzle-selection task is intended to measure aggression through a scoring system that codes easy puzzles as +1, medium puzzles as 0, and hard puzzles as -1 (Saleem, Anderson, & Barlett, 2015). The participant's score is then calculated by summing the 11 puzzles the participant chose for the other participant to complete, which results in a score ranging from -10 to +10. The lower the score, the more aggressive the participant was being by selecting more hard puzzles for a future participant to work on. Using this measure allowed for the analysis of levels of state aggression in each of the experimental conditions. Saleem, Anderson, and Barlett (2015) demonstrated that the THHT is a well-supported and validated as a measure of aggression.

### **Part 2: Kimchi-Palmer Shape Task**

Once the participants finished the THHT, they then performed the Kimchi-Palmer Shape Task (Appendix B; Kimchi & Palmer, 1982). Although this task typically is used to evaluate the processing style of a participant, in this case it was used as part of the cover story and was not actually relevant to the present research. While responses to the Kimchi-Palmer Shape Task are not included in the present analyses, the results from the Kimchi-Palmer Task may be used at a later point to investigate the impact that music has on information processing style.

### **Part 3: Positive and Negative Affect Schedule (PANAS)**

After completing the Kimchi-Palmer Task, participants filled out the PANAS (Appendix C; Watson, Clark, & Tellegen, 1988). The purpose of this instrument was to assess the state affect of participants as they were listening to the song to which they were randomly assigned. The PANAS instructs participants to rate their current feelings in

terms of 20 affective adjectives (e.g., happy, sad, upset, etc.) using a series of 5-point scales labeled 1 = “I Didn’t Feel This Way At All” and 5 = “I Felt This Way Very Strongly”. The PANAS provided three different scores, a sum of the negative affective state scores, a sum of positive affective state scores, and total score, which was computed by subtracting the positive sum from the negative sum. The total score provided a measure of where participants fell on a spectrum from a positive affective state to a negative affective state. The PANAS was also used as a manipulation check to ensure that the participant was experiencing the affective response as expected to their experimental condition. Specifically, participants were expected to report a higher level of affective hostility when exposed to the antisocial lyrics as compared to prosocial lyrics and heavy metal background music as compared to calm background music. A variety of studies have used the PANAS and have established its construct validity and reliability (Carvalho et al., 2013).

#### **Part 4: Lyric Attention Check (LAQ)**

The next measure that participants filled out was an attention check (Appendix D). Specifically, participants read a series of snippets from the lyrics of the song they had been randomly assigned to hear and were asked to rate each snippet using a 5-point scale (1 = “Definitely Was Not A Lyric in the Song” to 5 = “Definitely Was a Lyric in the Song”) to indicate how certain they were that they had in fact heard each snippet. The purpose of this measure was to ensure that participants did in fact attend to the song to which they were exposed and were not distracted or inattentive during this earlier portion of the study.

**Part 5: Buss-Perry Aggression Questionnaire – Short Form (BPAQ-SF)**

The next part of the survey involved the measurement of trait aggression using the BPAQ-SF (Appendix E; Bryant & Smith, 2001). Responses to this particular measure were used in analyses to assess the degree to which trait aggression impacts the relationship between violent music exposure and state aggression. The BPAQ-SF is composed of 12 statements (e.g., “I have threatened people I know”) that respondents rate using a 5-point scale labeled 1 = “extremely uncharacteristic of me” and 5 = “extremely characteristic of me.” Although this measure can be scored to include four subscales of aggression, for the purpose of the present study, a total score was computed for each participant as a measure of overall trait aggression. This instrument was chosen because it has been shown to be reliable and to possess strong construct reliability as a measure of trait aggression in undergraduate samples (Bryant & Smith, 2001), even though it is a shortened form of the original 29-item Buss-Perry Aggression Questionnaire (Buss & Perry, 1992). Using a shortened version of this instrument allowed for more participants to be ran in a shorter amount of time and helped avoid cognitive fatigue among respondents.

**Part 6: Demographic Questionnaire**

The final part of the study was a simple demographic questionnaire. This instrument included self-report questions concerning sex, ethnicity, and age.

## CHAPTER III

### RESULTS

#### Manipulation and Attention Check

In order to ensure participants were both paying attention to the song and were experiencing the affective response in line with the experimental condition, both the attention and manipulation check were analyzed. Only eight of the 168 participants failed the attention check and were therefore excluded from the following analyses. Depending on the condition (i.e., song), each participant was expected to have particular affective responses based on the lyrical content and background music. For example, the condition with antisocial lyrics and heavy metal background should facilitate the strongest feeling of affective hostility in the participant. According to the analysis of the manipulation check, participants did significantly differ in affective response (i.e., level of hostility) between at least two of the conditions  $F(4,159) = 8.818, p < .001, \eta^2 = .186$ , *Table 1*. Further investigation of the pairwise comparisons allowed for the conclusion to be drawn that participants did significantly differ in terms of affective hostility as expected. Specifically, affective hostility was significantly higher when exposed to antisocial lyrics, but when the lyrics were prosocial, the background music lead to increased hostility.



Condition	Mean	<i>SD</i>	N
Antisocial Lyrics/ Heavy Metal Background	2.23	1.202	40
Prosocial Lyrics/ Heavy Metal Background	1.63	0.973	39
Antisocial Lyrics/ Upbeat Tone Background	2.07	1.307	30
Prosocial Lyrics/ Upbeat Tone Background	1.13	0.341	34
Control (No Music)	1.16	0.374	25

Table 1. PANAS (Hostility): Means and Standard Deviations

## Main Effect, Mediation, &amp; Moderation

**Hypothesis 1**

The primary purpose of the present study was to investigate the relationship between music and aggressive behavior. The first hypothesis states there will be a main effect of lyrical content on the level of aggression. Specifically, participants who were exposed to antisocial lyrics were expected to behave more aggressively, as evidenced in their responses to the THHT. As seen in *Figure 4*, Hypothesis 1 was not supported by the data. A one-way ANOVA on level of aggression by lyrical content, controlling for trait aggression and sex, was nonsignificant,  $F(2,158) = 1.048, p = .353, \eta^2 = .014$ .

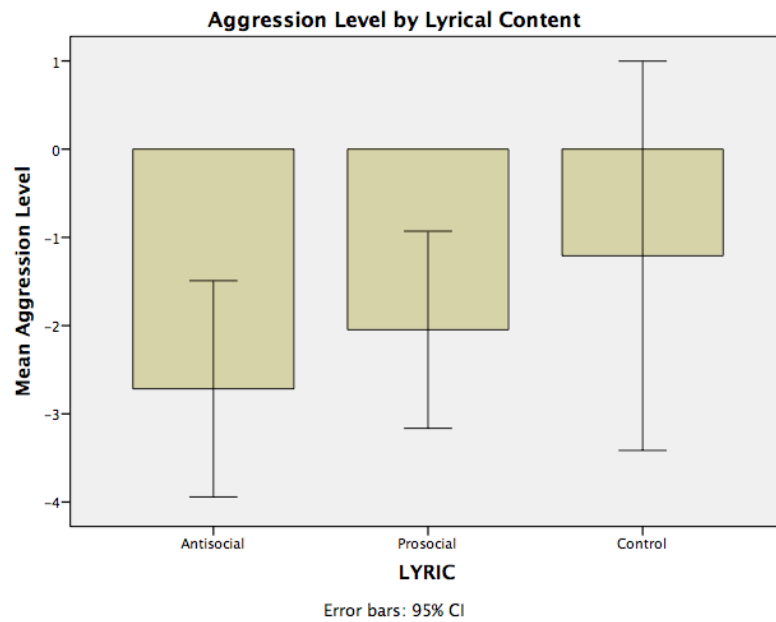


Figure 4. Main Effect: Aggression by Lyrics Content

## Hypothesis 2

The next hypothesis to be tested concerns the interaction between a song's lyrics and background music. Specifically, hypothesis 2 states lyrical content will interact with style of background music, such that when participants are exposed to antisocial lyrics paired with calm background music, they will exhibit more aggressive behavior than in any other experimental condition. Contrary to this hypothesis, a two-way ANOVA, controlling for trait aggression and sex, revealed a nonsignificant lyrics x background music two-way interaction,  $F(1,158) = 1.918, p = .168$  (Figure 5). Although nonsignificant, the directionality of the interaction is as hypothesized with participants who listened to the antisocial lyrics with calm background behaving most aggressively.

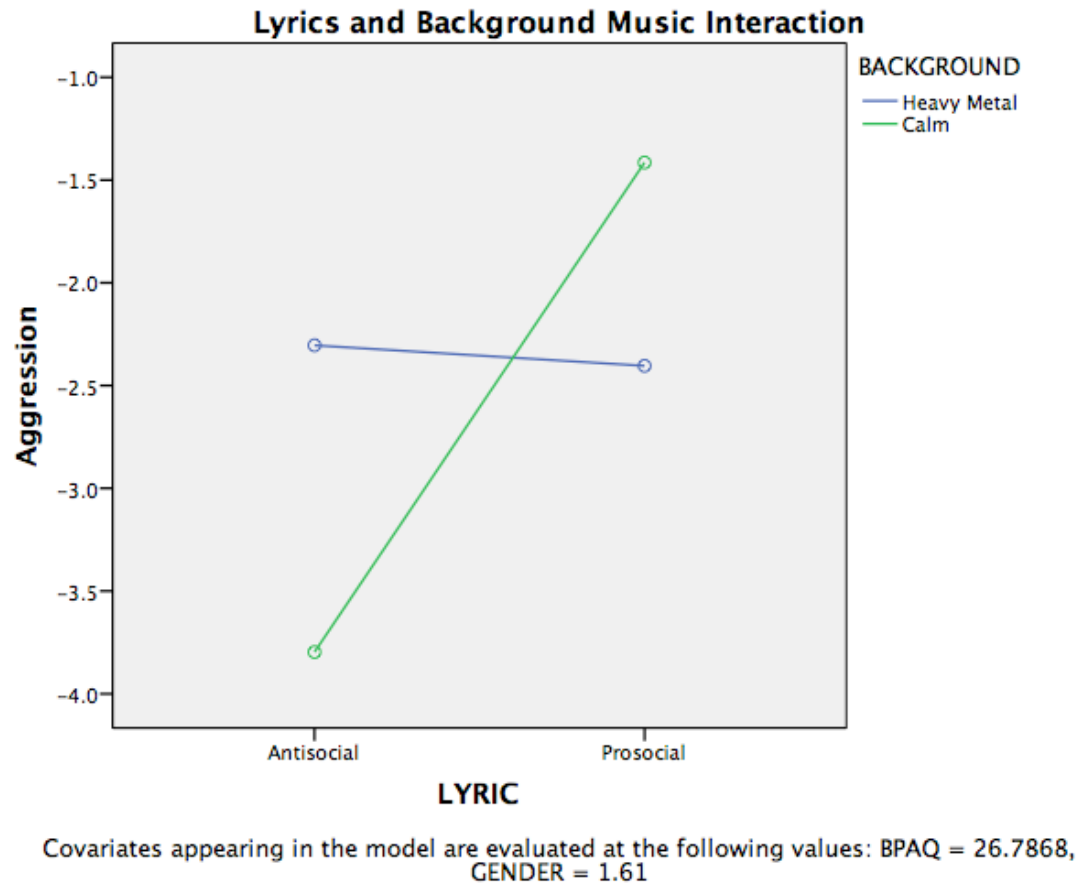


Figure 5. Two-Way Interaction: Lyrics x Background Music

### Hypothesis 3

With affect playing an integral role in the GAM, it was hypothesized that affect would have a significant and indirect effect between music and aggression. Thus, when affective hostility is entered into the model, the direct effect between lyrics and aggression would disappear and affective hostility would act as a mediator. The SPSS macro program PROCESS (Hayes, 2012) was used to test the hypothesized mediational model. Lyrical content was entered as the independent variable, the participant's level of affective hostility from the PANAS was entered as the mediator, and aggression as assessed by the THHT was entered as the dependent variable. The data from the present

study does not support this hypothesis, as the full mediational model was non-significant.

The mediational model is depicted in below (*Figure 6*), where the number next to the arrow represents the regression coefficient between the two variables, an asterisk (\*) represents a significant effect of  $p < .05$ , and the regression coefficient in parentheses represents the regression coefficient once affective hostility is entered into the model.

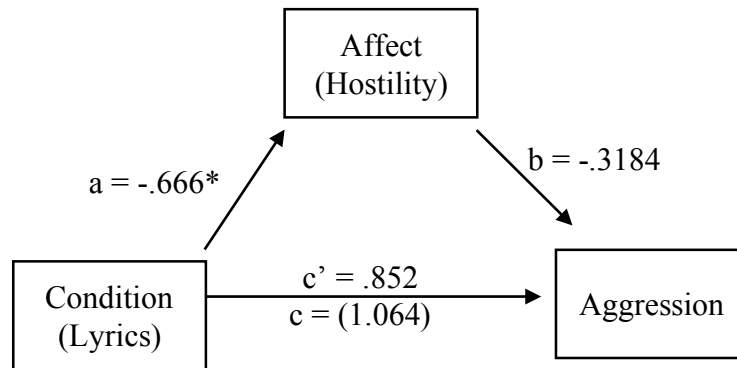


Figure 6. Mediation: Affect as a Mediator Between Song and Aggression

## CHAPTER IV

### DISCUSSION

The present study is an extension of a larger field of research investigating the relationship between music and behavior. Specifically, prior research has found that violent music influences an individual's level of aggressive behavior (Brummert-Lennings & Warburton, 2011; Fischer & Greitmeyer, 2006; Rubin, West, & Mitchell, 2001). Given the results of the present study, this direct relationship does not always seem to be the case. In particular, the present study failed to find either a main effect of lyrical content or an interaction between lyrical content and background music on individuals' levels of aggressive behavior, nor was the relationship between music and aggression mediated by the affective response. These results appear to contradict the conceptual models and empirical findings of previous research. These results may be due to differences in the methodology of the present study compared to previous research.

The most substantial difference between the present study and previous research is the stimuli (i.e., music) used. Previous studies that found an effect of music on aggressive behavior used songs that are publically available and to which participants could have previous exposure. This potential for previous exposure to the stimuli introduces a possible confound to these earlier studies. A participant who has previously listened to the song used in one of these earlier studies may have had a cognitive

association, either positive or negative, with that particular song. This cognitive association may potentially overflow into the individual's affective state or even the individual's behavior. The present study eliminated this confound by using a novel musical stimulus to which the participants could not have had a prior cognitive association.

Aside from the stimuli used, there may be a few other differences between the present study and previous research as to why the results did not support the hypotheses. For instance, the dependent measure of aggression used in the present study, the THHT, may not have been sensitive enough to capture the differences in aggression. If the study was replicated, but another method of measuring aggressive behavior (e.g., Hot Sauce Paradigm) was used, the results may potentially support the hypotheses. A few other potential differences that may account for the nonsignificant results may be the time between the music and the completion of the measure, the length of the song the participant listened to, or even the volume of the song that was listened to.

The results of the present study may well support the GAM. The music enters the model as a situational component that influences the individual's present internal state. Specifically, music may influence the internal state through the affective route of the GAM. This study diverges from previous research in the final stage of the GAM model, specifically in the appraisal and decision process. According to the GAM, resulting behavior either manifests through a thoughtful or impulsive behavior. While music may influence the internal state of the individual, it may not be enough to cause the individual to break the threshold and engage in the impulsive actions that other studies have shown (Brummert-Lennings & Warburton, 2011). The lack of an effect on behavior may be due

to difference in stimuli used in the present study. Thus, people who have a prior association between a violent song and a negative event may engage in impulsive actions such as aggression, whereas people who have no such prior association (as is the case with a novel musical stimulus) may not respond aggressively to the violent song. Due to the importance of music in daily life, it is of the utmost importance to further understand this relationship.

### Implications

Given the magnitude of music in the daily human life, it is of the utmost importance to understand the effect that music has on both behavior as well as cognition. The present study investigated this relationship in one context: aggression. While previous research has shown that violent music is related to an increase in aggressive behavior, the present study did not support this conclusion. On the other hand, the results did support the belief that music can influence an individual's affective state. Understanding how music influences an individual's affective state has several major implications for society.

Affective state plays a substantial role in a variety of critical cognitive and behavioral processes, including judgment (Lerner, Small, & Lowenstein, 2004), cognitive processing (Briñol, Petty, & Barden, 2007), and perception (Huntsinger, 2012). Because music may influence an individual's affective state, it may subsequently influence each of these critical processes. For example, according to the Affect-As-Feedback model (Huntsinger, 2012) a negative affect such as sadness may influence an individual's perceptual scope. Specifically, the negative affective state can act as a "red light" for the present perceptual processing style (e.g., local processing), subsequently causing the

individual to change to the opposite perceptual scope (e.g., global processing). Further research is necessary to understand the ways in which music influences human beings.

### Limitations and Future Direction

The present study had some potential limitations that may have influenced the results. One potential limitation was the novel stimuli used. While it was a positive in that it removed the confound from prior associations, but it also could be a negative because participants might have thought the song was unusual and discounted it. For example, in the conditions in which the lyrical content and background music did not logically go together (e.g., prosocial lyrics with heavy metal background music), people may have thought it was funny or weird, which may influence how they perceive the song. Another limitation of the present study is the use of self-report measures. The individual's trait aggression, state aggression, and affect were self-report measures, which naturally come with bias (e.g., desirability bias). Finally, one last limitation was the scope of the sample. The sample was limited to college students, which may strongly influence the results. Specifically, they may not have taken the study seriously and were only trying to finish it so they could pass their psychology course. Replication of the present study with each of these limitations taken into account may provide one possible future direction for the research.

Research on aggression has progressed substantially over the past few decades. Through the development of various theoretical models, such as the GAM and the Catalyst Model, the understanding of aggression has expanded. Specifically, both of these models have demonstrated the influence of an individual's predispositions and situational factors that may lead the individual to act aggressively. Generally speaking,

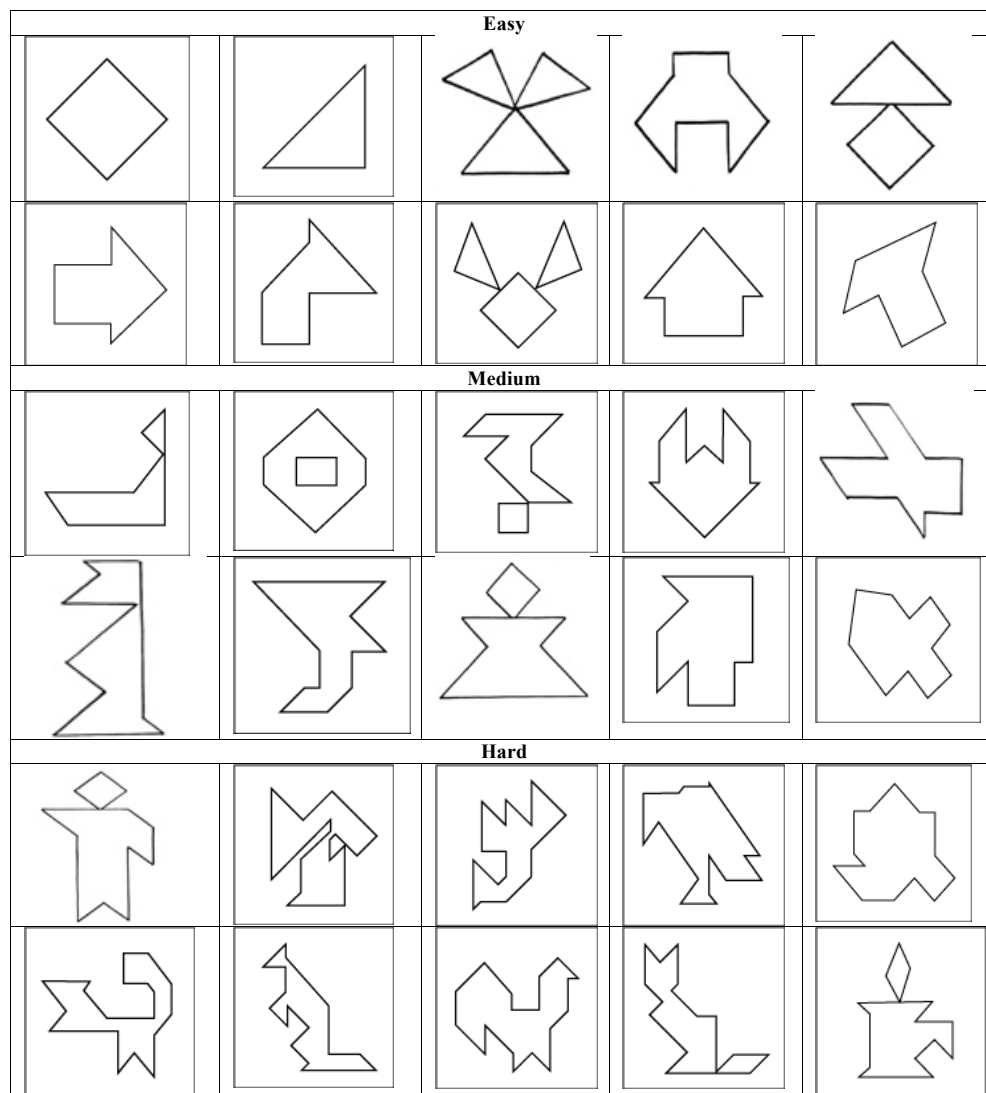


aggression consists of cognition, affect, and arousal and may have various person-centered predispositions that can influence each of those factors (Anderson & Bushman, 2002). Although the present study investigated the affective component of this model, much more work is necessary in order to fully understand how music may influence an individual's level of aggression. One potentially profitable direction for future research is to explore how music may influence arousal level, as the GAM shows the importance in an individual's internal state. For instance, consider the level of excitement and arousal one has when listening to music at a concert. Is the relationship between music and behavior at a concert due to the environment, the music itself, or possibly a combination of both? The distinction between the influence of music itself and the people and other environmental stimuli at a concert is an important distinction that must be made in order to further understand the relationship between music and aggression. One direction that this research could take in investigating this question is to measure physiological arousal (e.g., heart rate) while participants listen to each of the various songs. It is integral to the research of aggression to further understand the role that music plays in aggressive behavior. This is especially the case given the importance that music plays in daily life.

APPENDIX A  
TANGRAM HELP-HURT TASK

### Tangram Puzzle Task















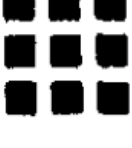
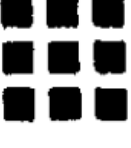


You are now going to assign 11 tangram puzzles to the other participant to solve in 10 minutes. The other player will be eligible to win a \$25 gift certificate if they complete 10 tangrams in 10 minutes. If they fail to solve the 10 tangrams you assigned to them within the time limit, they will not be able to win the gift certificate. However, please remember that the other participant will not see you or know who you are, so feel free to assign them any tangrams you like. Please circle the 11 tangrams you wish to assign the other participant. Please let the experimenter know once you are done.

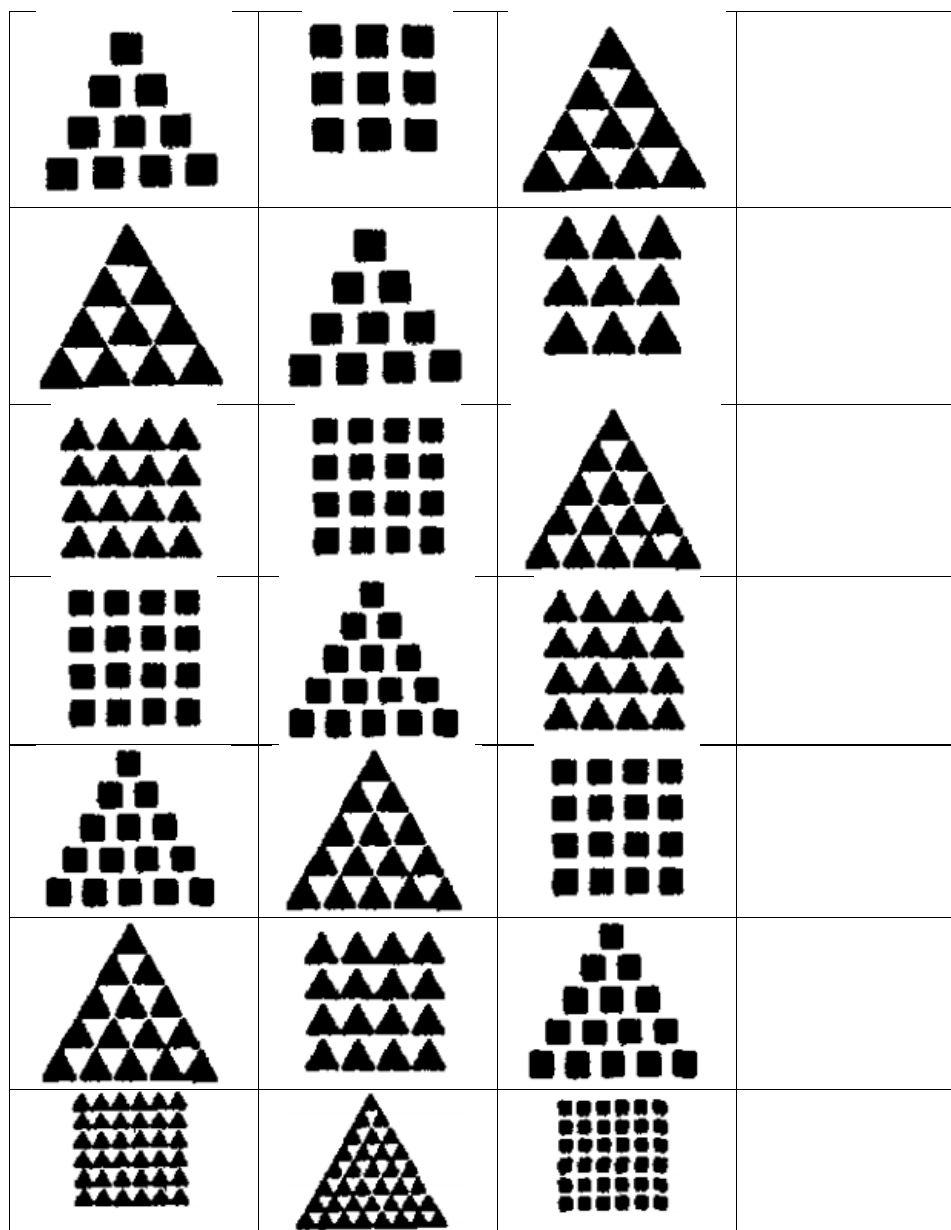


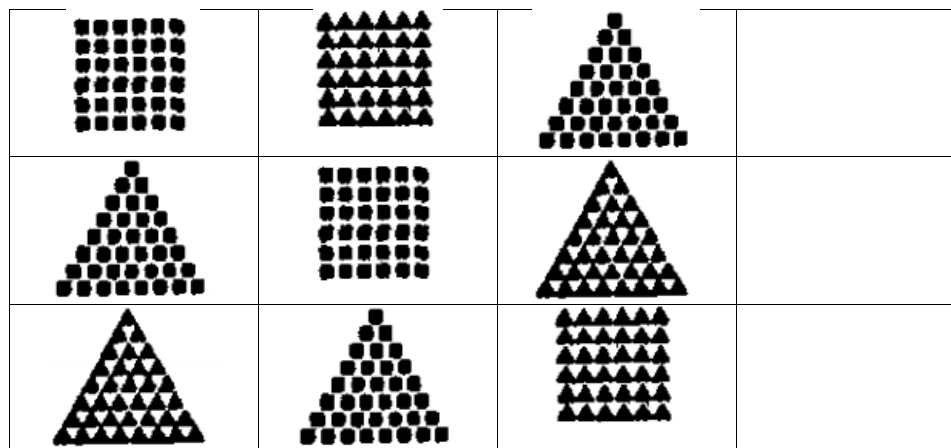
APPENDIX B

KIMCHI-PALMER SHAPE TASK

You will now be asked to participate in a psychological task. You will be shown a target figure made of shapes and given two different figures as answer choices. AS QUICKLY AS POSSIBLE, choose the figure that to you is most similar to the target figure shown in the question and write the column letter (A or B) in the CHOICE column. Please do not change your choice after you have written it down.

TARGET	A	B	CHOICE
			
			
			
			
			
			





APPENDIX C

POSITIVE AND NEGATIVE AFFECT SCHEDULE



## PANAS

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This scale consists of a number of words that describe different feelings and emotions. Read each item and then indicate on the scale to what extent you felt this way **while listening to the song earlier**. **If you did not listen to a song, to what extent do you feel this way right now, that is, at the present moment.**

	Very Slightly or Not At All (1)	A Little Bit (2)	Moderately (3)	Quite A Bit (4)	Extremely (5)
Interested					
Distressed					
Excited					
Upset					
Strong					
Guilty					
Scared					
Hostile					
Enthusiastic					
Proud					
Irritable					
Alert					
Ashamed					
Inspired					
Nervous					
Determined					
Attentive					
Jittery					
Active					
Afraid					

APPENDIX D

LYRIC ATTENTION QUESTIONNAIRE

## LAQ

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Below is a list of lyrics. Please check the level of certainty that you heard the snippet of lyrics from the song that you listened to earlier in the study.

Lyrics	Absolutely was NOT in the song	I don't think it was in the song	I am unsure	I think it was in the song	Absolutely was in the song
My hear is filled with love; my heart is filled with care...					
Every time I see you I want to hurt you, I want to kill you...					
I want to hurt hurt hurt you...					
I want to lift you; I want to assist you...					
I'm itching just to cut you...					
My heart is filled with hate; my heart is filled with bile...					
I want to help help help you...					

## APPENDIX E

### BUSS-PERRY AGGRESSION QUESTIONNAIRE – SHORT FORM

## AQ

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Please use the scale provided to indicate how well each of the following statements describes you. For each statement, check the box from 1 = “extremely uncharacteristic of me” to 5 = “extremely characteristic of me” to indicate how well the particular statement describes you.

	Extremely Uncharacteristic of Me (1)	Uncharacteristic of Me (2)	Neither Uncharacteristic or Characteristic of Me (3)	Characteristic of Me (4)	Extremely Characteristic of Me (5)
I often find myself disagreeing with people.					
At times I feel I have gotten a raw deal out of life.					
I have threatened people I know.					
I wonder why sometimes I feel so bitter about things.					
I have trouble controlling my temper.					
My friends say that I’m somewhat argumentative.					
I flare up quickly but get over it quickly.					
Given enough provocation, I may hit another person.					
I can’t help getting into arguments when people disagree with me.					
Other people always seem to get the breaks.					
There are people who pushed me so far that we came to blows.					
Sometimes I fly off the handle for no good reason.					

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## VITA

Mr. Triplett completed his Bachelor of Arts in Psychology at Ohio State University in the Fall of 2014 and is currently working on his Ph.D. in Applied Social Psychology at Loyola University Chicago. Mr. Triplett's research interests are aggression, emotion and cognition, and information processing. Aside from research, Mr. Triplett has a strong interest in statistics and is assisting Michael Agliardo, a professor of Sociology at Loyola University Chicago, and James Jackson, a professor of Psychology at University of Michigan, with statistical analyses. Through this experience, Mr. Triplett hopes to apply these skills to work as a statistical consultant as well as a career in academia.

Mr. Triplett's Masters Thesis stemmed from an undergraduate thesis at Ohio State with Dr. Brad Bushman investigating the influence of music and aggression. Mr. Triplett is also involved in a variety of other research projects, including research on emotion and cognition and the relationship between physical attractiveness and trust and helping attitudes.