



VOLUME TWO

MUSIC<sup>IN  
THE</sup>  
SOCIAL<sup>&</sup>  
BEHAVIORAL  
SCIENCES  
AN ENCYCLOPEDIA

WILLIAM FORDE THOMPSON <sup>EDITOR</sup>

# MUSIC

IN THE

## Social and Behavioral Sciences

*An Encyclopedia*

Volume 2

**William Forde Thompson**  
*Macquarie University*  
EDITOR

**Alexandra Lamont**  
*Keele University*

**Richard Parncutt**  
*University of Graz*

**Frank A. Russo**  
*Ryerson University*

ASSOCIATE EDITORS

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# List of Contributors

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- |                                                                    |                                                                             |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Rita Aiello<br><i>New York University</i>                          | Emmanuel Bigand<br><i>Université de Bourgogne</i>                           |
| Paolo Ammirante<br><i>Ryerson University</i>                       | Sarah Boak<br><i>University of Southampton</i>                              |
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| Artemis Apostolaki<br><i>University of Hull</i>                    | Bernd Brabec de Mori<br><i>University of Music and Performing Arts Graz</i> |
| Richard Ashley<br><i>Northwestern University</i>                   | Jillian L. Bracken<br><i>University of Western Ontario</i>                  |
| Michael Austin<br><i>Howard University</i>                         | Evan David Bradley<br><i>Pennsylvania State University</i>                  |
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| Felicity Baker<br><i>University of Melbourne</i>                   | Jacob Braun<br><i>Bowling Green State University</i>                        |
| Daniel Bangert<br><i>University of New South Wales</i>             | Roberto Bresin<br><i>KTH Royal Institute of Technology</i>                  |
| Katherine Bank<br><i>University of London</i>                      | Nancy Bressler<br><i>Bowling Green State University</i>                     |
| Jonathan Bruce Barber<br><i>National Ageing Research Institute</i> | Warren Brodsky<br><i>Ben-Gurion University of the Negev</i>                 |
| David Bashwiner<br><i>University of New Mexico</i>                 | Debra Burns<br><i>Purdue University Indiana</i>                             |
| Christine Beckett<br><i>Concordia University</i>                   | Densil Cabrera<br><i>University of Sydney</i>                               |
| Tonya Bergeson<br><i>Indiana University School of Medicine</i>     | David Cashman<br><i>Southern Cross University</i>                           |

- Roger Chaffin  
*University of Connecticut*
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*MIAM Istanbul Technical University*
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*University of Miami*
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- Eduardo Coutinho  
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- Eugene Dairianathan  
*Institute of Ethnomusicology, University  
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- Andrew Geeves  
*Macquarie University*
- Monika Geretsegger  
*Aalborg University, Denmark/  
University of Vienna, Austria*
- Joice Waterhouse Gibson  
*Metropolitan State University  
of Denver*
- Bruno Gingras  
*University of Vienna*
- Jane Ginsborg  
*Royal Northern College of Music,  
Manchester*
- Robert O. Gjerdingen  
*Northwestern University*
- Jonathan Glixon  
*University of Kentucky*
- Daniel González Moya  
*Freie Universität Berlin*
- Arla Good  
*Ryerson University*
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*University of Western Ontario*
- Alexander Graur  
*University of Torino*
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*Royal Academy of Music*

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*Ithaca College*
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*University of Nevada, Las Vegas*
- David Hargreaves  
*Roehampton University*
- Ralph Hartsock  
*University of North Texas*
- Marta Hawryluk  
*John Paul II Catholic University of Lublin*
- Lars Erik Helgert  
*Georgetown University*
- William M. Helmcke  
*University of Massachusetts Amherst*
- Ruth Herbert  
*University of Oxford*
- Stephen Hinton  
*Stanford University*
- Matthew Hollow  
*Durham University*
- Lisa Hooper  
*Tulane University*
- David Martin Howard  
*University of York*
- Michael Huber  
*Institute for Musiksoziologie*
- Martyn Hudson  
*Newcastle University*
- Bryn Hughes  
*University of Miami*
- Elina Hytönen-Ng  
*University of Eastern Finland*
- Kelly Jakubowski  
*University of London-Goldsmiths*
- Molly Jeon  
*Independent Scholar*
- Jörg Jewanski  
*University of Münster*
- Jordan Johnson  
*Bowling Green University*
- Nicolai Jørgensgaard Graakjær  
*Aalborg University*
- Olivier Julien  
*Paris-Sorbonne University*
- Melissa Jungers  
*Ohio State University*
- Łukasz Kaczmarek  
*John Paul II Catholic University of Lublin*
- Maria Katsipatakis  
*University of Durham*
- Kim Kattari  
*Texas A&M University*
- Peter E. Keller  
*University of Western Sydney*
- Dianna Theadora Kenny  
*University of Sydney*
- Neha Khetrapal  
*Macquarie University*
- Andrew King  
*University of Hull*
- Elaine King  
*University of Hull*
- Stefan Koelsch  
*Freie Universität Berlin*
- Dimitra Kokotsaki  
*University of Durham*
- Vladimir J. Konečni  
*University of California, San Diego*
- Anastasya Koshkin  
*Columbia University*
- Franz Kasper Krönig  
*Cologne University of Applied Sciences*
- Kinga Krzymowska-Szacón  
*John Paul II Catholic University of Lublin*
- Belma Kurtisoglu  
*Istanbul Technical University*
- Alexandra Lamont  
*Keele University*
- Lara Lengel  
*Bowling Green State University*
- Lisa Liskovoi  
*Ryerson University*
- Marie Pierre Lissoir  
*Université Libre de Bruxelles*
- Fang Liu  
*University College London*



Steven R. Livingstone  
*Ryerson University*  
Raymond MacDonald  
*Edinburgh University*  
Karl George Madden  
*City University of New York*  
Damien Mahiet  
*Denison University*  
Stephen Malloch  
*University of Sydney*  
Elizabeth Hellmuth Margulis  
*University of Arkansas*  
Flavia Marisi  
*Independent Scholar*  
Rossella Marisi  
*Independent Scholar*  
Jeremy Marozeau  
*Bionics Institute*  
Elizabeth Marvin  
*University of Rochester*  
Eldonna L. May  
*Wayne State University*  
Susan E. Mazer  
*Independent Scholar*  
Karen McAulay  
*Royal Conservatoire of Scotland*  
Josh H. McDermott  
*Massachusetts Institute of Technology*  
Lytton N. McDonnell  
*Rutgers University*  
Brett McKern  
*Australian Music Centre*  
Gary E. McPherson  
*University of Melbourne*  
Prayna Devi Mehan  
*University of Western Ontario*  
Dawn L. Merrett  
*University of Melbourne*  
Dorothy Miell  
*University of Edinburgh*  
Matthew Mihalka  
*University of Arkansas, Fayetteville*  
Jennifer Mishra  
*University of Missouri*  
Shawn Mollenhauer  
*Metropolitan State University of Denver*  
Joseph E. Morgan  
*New England Conservatory*  
Terry A. Morrow  
*Nova Southeastern University*

Graça Mota  
*Instituto Politecnico do Porto*  
Kathleen M. Murphy  
*University of Evansville*  
Eugene Narmour  
*University of Pennsylvania*  
Lillooet Nordlinger  
*Carleton University*  
Adam Ockleford  
*University of Roehampton*  
Brooke M. Okada  
*University of Maryland, College Park*  
Rowan Oliver  
*University of Hull*  
Kirk N. Olsen  
*University of Western Sydney*  
Alessandra Padula  
*Conservatorio di Musica "Giuseppe Verdi"–  
Milan*  
Richard Parncutt  
*University of Graz*  
Mercedes Pavlicevic  
*Nordoff Robbins Music Therapy*  
Jonathan Geoffrey Secora Pearl  
*Independent Scholar*  
Jessica Phillips-Silver  
*BRAMS, Montreal*  
Chiara Pierobon  
*Bielefeld University*  
Jonathan Pitkin  
*Royal College of Music*  
Nick Poulakis  
*National and Kapodistrian University  
of Athens*  
Jon Prince  
*Murdoch University*  
Hyacinthe Ravet  
*Université Paris-Sorbonne*  
Christina L. Reitz  
*Western Carolina University*  
Nicholas Reyland  
*Keele University*  
Nikki Rickard  
*Monash University*  
Cricia Rinchon  
*University of Western Ontario*  
Frank A. Russo  
*Ryerson University*  
Stephanie Salerno  
*Bowling Green State University*

- Ysabel M. Sarte  
*University of Kentucky*
- E. Glenn Schellenberg  
*University of Toronto*
- Amanda Scherbenske  
*Wesleyan University*
- Klaus R. Scherer  
*Swiss Center for Affective Sciences*
- Michael F. Schober  
*New School for Social Research*
- Franziska Schroeder  
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*University of New South Wales*
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*McMaster University*
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*Institute of Contemporary Music  
Performance*
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- Gaye Soley  
*Bogaziçi University*
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*University of Cambridge,  
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- Thomas Stegemann  
*University of Music and Performing Arts,  
Vienna*
- Catherine Stevens  
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*New School for Jazz and  
Contemporary Music*
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*University of Salford*
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- Nico Thom  
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- William Forde Thompson  
*Macquarie University*
- Barbara Tillmann  
*Lyon Neuroscience Research Center*
- Laurel J. Trainor  
*McMaster University*
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*Edge Hill University*
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*University of Edinburgh*
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*University of Music and Performing Arts,  
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- Giorgos Tsisiris  
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*University of California,  
Los Angeles*
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*University of Western Ontario*
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*University of Southern California*
- Victoria Williamson  
*University of London-Goldsmiths*
- Graeme Wilson  
*Newcastle University*
- Sarah Winokur  
*Smith College*
- Reba A. Wissner  
*Berkeley College*
- Clemens Wöllner  
*University of Hamburg*



for music that was popular for participants' parents, and to a lesser extent grandparents, when they were young adults, which shows how music preferences can be shaped by early experiences and serve to connect families.

Research looking at shorter-term patterns of engagement with specific pieces of music has uncovered two types of listener among young adults. Some listeners, termed *magpies*, engage with music that is currently available to them and popular. They refresh their listening habits fairly regularly, but may go through phases of repeatedly listening to the same set of tracks or have the same favorite piece of music for several weeks. Others, termed *squirrels*, have more extensive music libraries, and select from and rotate their listening to music that they have collected over much longer time spans. These listeners seem more aware of the functions that music plays for them, and they may share features in common with the more engaged music listeners uncovered in other music preference research.

There is a vast amount of research on music preferences, from a range of different theoretical and empirical perspectives. These range from the individual differences approach that considers music preference as a more stable characteristic that can be related to other such stable features as personality, through the more real-world approaches that look at music choices on a moment-to-moment basis as a function of context, motivation, and culture, to in-depth qualitative enquiry of music engagement across the lifespan. Music preference can act as a cipher to other personality variables, as a way of helping people get to know each other, and as a narrative structure for emotional engagement and biography.

Alexandra Lamont  
Keele University

**See Also:** Complexity; Everyday Uses of Music; Identity; Music Journalism.

### Further Readings

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## Music Research, Causal Effects in

Identification and exclusion of causes are key features of human thought about phenomena, science, and scholarship. In the context of empirical, quantitative research, "causal effects" refers to findings that justifiably and legitimately allow a combination of statistical and logical determination of their cause, or a satisfactory approximation to it. The data environment (or the profile of findings) and the statistical and logical procedures used for such determination are termed *causal analysis*. "Empirical" refers to the totality of experimental, correlational, observational, and archival research efforts. "Quantitative" is placed in opposition to "qualitative," but the distinctions are sometimes fine. In general, experiments yield causal information by means of research design, whereas correlational and archival studies may provide solid pointers to causation with the help of causal analysis, which includes the study of causal mediation and the identification of causal models. Sophisticated causal analysis is particularly useful in the social and behavioral sciences when addressing a problem in which multiple empirical, quantitative procedures are used in a planned manner, which is comparatively rare in music research.

### Experimental Investigations

A large number of problems in the investigation of various aspects of music, such as performance, perception, cognition, and reception, can

be addressed by experiment. However, it requires considerable knowledge and skill to devise experimental designs that are conceptually and logically able to yield unambiguous results. Deficient designs abound in the published research in which several alternative explanations for the data are both substantively and logically possible, or there are "confounding variables" in the experiment. Technically, this means that the data can be equally well accounted for by various alternative causal models. Apart from the problems introduced, for example, by improper sampling of participants, inadequate control groups, and poorly planned and administered experimental stimuli, a frequent cause of confounding variables lies in the measurement of the dependent variable—the reasons for its choice and the manner of its application. A great many measures have been used in experimental music research, including various types of self-report, psychophysiological and functional neuroimaging measures, as well as behavioral, perceptual, and cognitive ones. Each of these, especially in isolation, but even when multiple measures are used, can be a source of confounding; and each can, in conjunction with other aspects of the research design, open the door to alternative causal explanations. Confounding variables can be avoided by careful thought about causation when designing an experiment, prior to its initiation.

### Correlational Investigations

Empirical research that is structurally correlational, whether or not quantification is explicitly involved, abounds in the social and behavioral sciences that are involved with music, especially in the extensive field of psychology of music. The elementary logical and statistical dictum that "correlation is no proof of causation" is sometimes ignored, especially in research areas where enthusiasm about new research techniques may temporarily overwhelm caution, such as functional brain imaging. There are broad areas, with a massive number of published studies (e.g., music preference), which are often ready-made to profit from the application of causal mediation analysis, yet for a variety of reasons, many such studies have neglected to do so. And there is otherwise important research using retrospective techniques, such as that on peak experiences with

music, which has been conducted in such a way that key information that would enable invaluable causal analysis is essentially irretrievable.

### Music Preference: Causal Models

Perhaps the largest field of research on music consists of reports of correlations between music preference and various organismic (age and gender), sociological, and personality factors. An enormous proportion of such studies concerns adolescents and college students. Research participants typically provide data retrospectively by means of paper and pencil measures or digital equivalents. Numerous personality tests have been used, with the five-factor model, sensation-seeking, and extraversion numerically dominating. There has been much work, starting already in the 1950s and continuing to this day, on the correlation between music taste and the popularity of young people among their peers; such studies are often concerned with correlations between music preference for a genre or a specific group or musician and clique membership, self-identity, communication style, and social-perception habits. Researchers have also shown much interest in adolescents' views, retrospectively given on some verbal measure, of drugs, sex, romantic relations, loneliness, attitudes to one's and the other gender, suicide, and cults; often proceeding to investigate the correlations between these youthful concerns and the preference for a music theme, such as "lost love" or violence, or a music attribute such as dynamics, mode, or tempo.

Unlike most of these studies, the research using the "experience-sampling" method, which began with pagers and moved to cellphones, sometimes yields useful data about the social ecology of forced exposure to music in public settings and intentional listening choices, but is structurally equally incapable of providing reliable information about the causal flow among the key variables. Researchers in the music preference field, when asking the standard correlational questions, have largely failed to obtain auxiliary data and perform additional statistical analyses, which would enable them to pursue matters beyond causal guesswork and authoritatively discuss the possible causal models, the "third variable" problems in inferences about their data, and the related issues of moderation and mediation.



*Fans rock out at the Misfits concert in Lancaster, Pennsylvania, September 24, 2011. The band's pseudo-secret cult following is known as the Fiend Club. Much research has been conducted on musical taste and peer popularity, especially concerning correlations between music preference for a genre or a specific group and clique membership, self-identity, communication style, and social-perception habits.*

Yet major advances in analytical and statistical techniques that address the fundamental causal issues in correlational data (the development of causal models and the use of structural systems of equations) have been made since at least the mid-1960s. These advances have been influential in economics, political science, sociology, and some areas of psychology (including the analysis of decision making, especially in the legal sphere), but have been virtually ignored in music research, including in areas, such as music preference, which could have amply profited from them. The first excellent, yet comparatively non-technical work on causal inference in nonexperimental quantitative investigations was published in 1961 by Hubert Blalock, followed in 1975 by another classic, David Heise's book on causal analysis, which begins with a description of operators as structured processes that implement causal relations and proceeds to discuss multiple causes, mutual causation, regression analysis of causal paths, and recursive and nonrecursive systems. Such analytic approaches have continued to increase in sophistication. Music researchers,

especially those working with correlational data, risk receiving criticisms of their scholarship by ignoring such developments.

### **Moderator and Mediator Variables**

From the standpoint of music research, perhaps the most useful presentation of important causal matters is contained in the technically accessible 1986 article by Reuben Baron and David Kenny on the moderator-mediator variable distinction. Although these authors mostly discuss applications in social psychology, their seminal article should be of great interest to researchers working with correlational data in the music preference and other music domains. The distinction between the "third variable" moderator-mediator functions is drawn in a way that highlights their differential implications for theory, research design, and concrete research operations and procedures. The statistical treatment of the data is described step by step in the article.

With regard to correlational data, moderators are third variables influencing the zero-order correlation between two variables that are primarily under investigation. In experimental and quasi-experimental designs, in which predictors and criteria (e.g., outcomes and dependent variables) are designated, moderators and predictors are logically at the same "distance" from the criterion in terms of their classification as proximal versus distal causal variables. In contrast, mediators are logically interpolated as third variables between predictors and outcomes, often as events or changes that take place inside an organism; they can be considered as proximal causes that explain why or how the effects of distal predictors occur. Both the moderator and the mediator respective causal chain can be presented as a path diagram that is both a descriptive and an analytical tool. Finally, it is possible for theoretical and applied concerns to dictate complex research designs with multiple predictors, multiple third variables, and multiple dependent measures, which may require path diagrams and statistical analyses that address both moderation and mediation within the same framework.

Suppose that a team of music preference researchers is interested in the relationship between musical taste and popularity with peers among the young. Suppose also that team

members define musical taste as the liking of a particular genre ("yes" or "no"). They have access to three groups of students of both genders, aged 11, 15, and 19. All research participants indicate their liking for the genre, and each, within the same age group, rates all other students on popularity. Researchers also hypothesize that the liking of the genre is associated with the proclivity to "show off" or "wear flashy clothes" (however the researchers choose to operationalize the issue of sexual display), and they obtain both self-ratings and ratings of others from, and of, all students on this measure. The simplified hypothetical results may be the following: (1) Both age and gender are identified as moderator variables, such that musical taste has no effect on the popularity of members of either gender at age 11, but it does at age 15 (for both boys and girls) and at age 19 (but for women only); (2) The correlation between 15-year-old boys' and girls' liking for the genre and their popularity with peers is fully mediated by the sexual-display measure, but this is true only for women at age 19.

This is a simplified account of the moderator and mediator combined causal action. There would be many complications in this research, just one of which is that one's perceived popularity affects self-report (truthful or not) of one's liking for the genre in question.

### **Investigations Relying on Retrospective Self-Reports**

Some well-known and frequently cited music investigations exclusively rely on retrospective self-reports, typically by means of interviews or questionnaires. Examples are studies of physiological "thrills" (chills) and of "peak experiences" in the presence of music. As a rule, numerous research participants and extensive reports are involved, the music pieces are described in detail, and there is a certain amount of quantification carried out by both participants and researchers. Despite the fact that basic statistics can be computed on some of these data, such research is chiefly valuable because it presents qualitative information about private events with regard to both context and experience. However, from the viewpoint of identification and exclusion of causes, this type of research is not informative; it does not provide the kind and amount of data that would allow

valid causal analyses. There is no guarantee that many possible relevant ingredients of the listening situation other than music have been reported to the researchers in sufficient detail and objectively. Yet, factors such as the presence of multiple colisteners behaving in various ways, the use of alcohol and drugs, and sexual and other activity by the study participants could have been the sole "true" causes of the reported experiences or important moderators or mediators of music's alleged effects.

### **Archival and Historiometric Measures**

Analyses of causal paths and mediation are sometimes useful, even in seemingly inaccessible problem areas and with barely satisfactory data. For example, Vladimir Konecni was interested in the relationships among major music composers' stressful life events, their acute emotions, and the quality of their creative output. In this tripartite situation, the effect of both adverse and joyous events in composers' lives on their acute emotions is self-evident. The effect of their acute emotions on creative output can be estimated, but with relatively low reliability, on the basis of letters, interviews, and contemporaries' accounts. Finally, the direct effect of "biographical stress" on creative output has been studied by Dean Simonton; he used historiometric methods in which a variety of life events for many major composers was coded, as well as multiple measures of creative output, such as total productivity, thematic productivity, and melodic originality. A reanalysis of these data showed no effect of stressful events on most measures of composers' output, and thus made superfluous the causal involvement of the frequently imputed mediator—the effect of composers' acute emotions on their musical output. This approach to the problem may stimulate further research.

### **Neuroimaging**

Several brain scanning techniques, each with individual application and measurement advantages and drawbacks, have been used in music research in the past 15 years. In functional magnetic resonance imaging (fMRI), changes in blood-flow oxygenation (hemodynamic response) related to energy use by brain cells following the presentation of a music stimulus can be mapped



in scanner-confined participants. Because of the correlational nature of key data obtained by this research method, exceptional interpretive caution is advised with regard to causal claims. For example, when participants are exposed to thrills- (chills- or shivers-) inducing music, one may observe changes in certain brain areas (i.e., the ventral striatum, amygdala, midbrain, and orbitofrontal cortex) that are known to also be implicated in numerous other reward-punishment, motivation, and emotion issues to do with food, drugs, and sex. To properly evaluate the validity of a causal claim of the form, "the data prove that music causes emotion," one must examine certain aspects of the investigation in question.

What is known from the scientific literature about the relationship between the phenomenon of thrills or chills and emotion? How were the thrills-chills stimuli selected for the study, and specifically, were they selected by the participants themselves? If so, can one eliminate the possibility that it is not the music that causes cerebral blood flow fluctuations, but that the cause instead, or in addition, is each participant's classically conditioned associations with various aspects of the original listening context? Because it is logically fallacious to equate oxygenation changes in brain areas with the subjective experience of emotion, pleasure, or some more specific aesthetic or hedonic state, have researchers carefully obtained self-reports from the participants? Have peripheral psychophysiological measures been obtained from the participants (including controls), preferably in separate sessions not involving neuroimaging?

Analogous questions should be asked of other music research that has used brain scanning. Nevertheless, neuroimaging techniques have great appeal in the development of vertically integrated theories of the human response to music that extend from the neural to the perceptual-cognitive and behavioral levels (such as music choice and evaluation).

### Music and Emotion: Causal Models

The domain of "music and emotion" is a major one in music research. It is also of particular interest to researchers concerned with the validity of causal claims; this is in part because many

research reports unjustifiably and without explicit acknowledgement take to mean "causes." In an attempt to encourage "causally responsible" designs and interpretation of research studies in this area, Vladimir Konecni has identified 13 different potentially viable causal models, all of them theoretically relevant and empirically researchable. In one set of models, music is the predictor and emotion the criterion; while in another, emotion is treated as a possible predictor of music choice. In both sets, variables such as visual imagery, episodic memory, and dance are proposed as possible mediators in different models. In one model, the possibility is considered of subsequent listening occasions repeatedly inducing an emotion akin to the one that was induced on the original listening occasion through the mediating effect of, for example, episodic memory.

There have been suggestions of mechanisms that underlie the (alleged) effect of music on emotion. The frequently unstated assumption in such suggestions is that the effect is causal, and moreover and paradoxically, that it is proximal, while simultaneously discussing the "underlying mechanisms." When the analysis is properly limited to music without a verbal narrative and auditory extramusical references, there remains the large body of instrumental classical music, especially in the Western canon.

Even a minimally introspective listener of such music realizes that moderators and mediators of music's effects, such as visual imagery, episodic memory, and evaluative conditioning, often have major causal functions. Taking the combined effect of episodic memory and visual imagery as an example, the effect of music on emotion may be fully mediated by such entirely nonmusical causal operators.

As philosophers would put it, music is here not the object of the emotion. Auxiliary data about the relative frequency with which music-related mediators occur, as opposed to the occurrence of effective memories and images in the complete absence of music, may suggest a moderator model that for some people entirely bypasses music, or a mixed moderator-mediator model for others. There is also a realistic possibility that instrumental (absolute) music, along with nonnarrative theater and dance, surpasses static-visual art forms

in emotion-induction by virtue of being temporally extended and thus more conducive to imagery and memory associations.

Vladimir J. Konečni  
University of California, San Diego

**See Also:** Converging Evidence; Correlational Study; Emotions, Aesthetic; Episodic Memory; Evaluative Conditioning; Imagery; Suicide.

### Further Readings

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## Music Thanatology and Hospice Care

Thanatology is the study of the phenomena of death and the psychological mechanisms associated with dying. Music thanatology is a practice in which prescribed music is played to patients at the end of life. Therese Schroeder-Sheker, an

accomplished harpist, founded the field in the 1970s. Her inspiration came from a study of monastic medicine that was based on a concern for the physical, emotional, mental, and spiritual pain that might accompany a person at the end of life. The prescribed music is played on harp, accompanied by voice, and is tailored to the patient's needs.

According to historical accounts of music played in monastic infirmaries for the sick and dying, the threshold between life and death was identified as the phase in which music was believed to be most effective. The intention of music thanatology therefore is to provide solace, dignity, and comfort, and to soothe restlessness, pain, and agitation during the threshold phase. It is not entertaining, nor does it address life problems, rather the music thanatologist provides a musical environment in which the patient can be released from pain and suffering, and can let go of life. Any difficult emotions are thought to be relieved by the music.

### How the Music Is Played and Used

Music thanatology is provided in hospitals and in the patient's home, often with family members present. The session is referred to as a vigil, and is a time of watchful attention to the needs of the patient, and may last between 45 minutes to an hour and a half, depending on the needs of the patient. Very little verbal communication takes place between the patient and the practitioner during the vigil.

Hospitalized patients may be referred to a music thanatologist for many reasons, but particularly if the patient is in an agitated state, where death is imminent. The music thanatologist provides prescribed music in response to the patient's physical and emotional state. For example, the rhythm and pacing of the musical phrase is matched to the breathing pattern and respiration of the patient, and fluctuation in the dynamics of the music also matches the rise and fall of the patient's physical and emotional state.

The music repertoire is predominantly quiet and restful, and is drawn from Gregorian chant, hymns, prayers, praise songs, lullabies, and other gentle and spiritual music of aesthetic beauty; however, there is no particular religious affiliation in the music.