Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Psychology

ELSEVIER

Review

A framework for analyzing the "choreomusical" relationship between dance and music

Steven Brown

Dance and music are foundational human behaviors that likely co-evolved as intertwined modes of social communication, artistic expression, and collective coordination. Despite their intertwined nature, dance and music are typically analyzed in isolation from one another, both in research studies and in applied settings. I present here a proposal for a general framework for conceptualizing the cross-modal relationship between dance and music. This framework is called SpREE and is based on the analysis of four key dimensions relating dance and music: Space, Rhythm, Entrainment, and Expression. Such a framework should be useful for not only understanding the rich diversity of dance and musical styles across world cultures, but for providing insight into clinical interventions such as dance therapy that are intrinsically based on the cross-modal interaction between dance and music.

Addresses
Department of Psychology, Neuroscience & Behaviour, McMaster University, Hamilton, ON, Canada

Corresponding author: Brown, Steven (stebro@mcmaster.ca)

Keywords
Dance, Music, Choreomusical, Entrainment, Expression.

Dance and music are foundational human behaviors that most likely co-evolved as intertwined modes of social communication, artistic expression, and collective coordination [1–6]. Despite this, dance and music are typically looked at in isolation when they are examined in research studies and applied settings. My aim in the current article is to make a move toward developing a general framework for analyzing the relationship between dance and music, whether in religious rituals, popular dances, or dance-therapy contexts. Throughout the article, I will refer to this as the "choreomusical" relationship [7–9], where the root "choreo" comes from the ancient Greek word for dance. My proposed framework for analyzing this relationship is called SpREE and is based on the analysis of four key choreomusical dimensions: Space, Rhythm, Entrainment, and Expression.

The choreomusical relationship

In the vast majority of cases, dance is a *hybrid* artform in which dance's movement patterns are combined with music to create a composite behavior [2,10]. The choreomusical relationship consists of a complex set of interactions between dance and music that span from mutual dependence to mutual disregard [11–15]. In many forms of dance, the movement patterns are choreographed to the music, and the choreomusical relationship is focused on how the phrase structure of the dance is *aligned* to that of the music. By contrast, in modern (contemporary) dance, the movement patterns are freed from this type of "subservience to the musical score" [16] such that the structures of the dance are only loosely coupled to those of the music.

There is a great need to develop a general framework for describing the choreomusical relationship, since cognitive work generally looks at dance and music independently of one another, despite their many shared features. For example, there is a large literature in music psychology devoted to the phenomenon of "groove," which refers to the inclination to move in response to music [17]. However, this work is completely divorced from the study of movement itself, instead limiting itself to an inclination. We need to move beyond virtual concepts of movement in the music psychology literature and instead develop a model of the *interactive* and *cross-modal* relationship between dance movement and musical sound. In addition, this work needs to explore the wide diversity of choreomusical patterns across dance styles cross-culturally.

A model of the choreomusical relationship has important implications for the clinical uses of dance, since dance is one of the most effective therapeutic interventions for treating mobility disorders [18–21]. Dance therapy is a *hybrid therapy* that brings together the clinical benefits of movement and music, respectively. The therapeutic potential of music is used to complement that of dance by means of *cross-modal reinforcement* to optimize the clinical impact of the treatment regimen for the patient [22].

Current Opinion in Psychology 2026, **72**:102409

This review comes from a themed issue on VSI: Psychology of Art

Edited by Eftychia Stamkou and Oshin Vartanian

For complete overview about the section, refer Psychology of Art

Available online 21 August 2026

https://doi.org/10.1016/j.copsyc.2026.102409

2352-250X/© 2026 The Author. Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

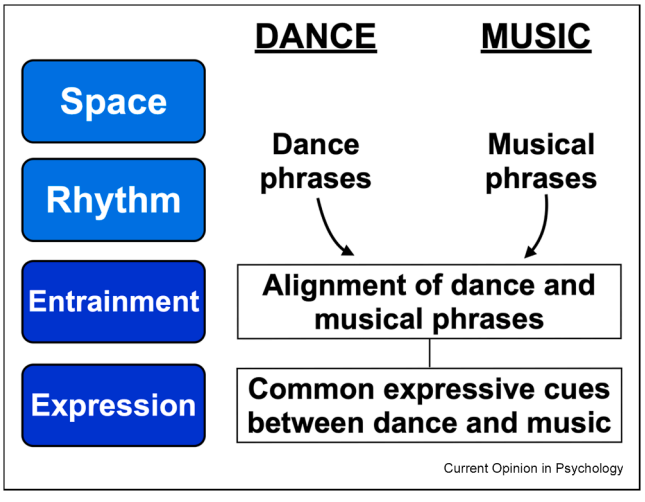
Toward a framework for analyzing the choreomusical relationship

My proposed framework for analyzing the choreomusical relationship is called SpREE and is based on an analysis of four key choreomusical dimensions: Space, Rhythm, Entrainment, and Expression (Figure 1). SpREE examines dance and music both as independent, domain-specific systems for building structure (via Space and Rhythm) and as interactive systems that function cross-modally to create combined choreomusical structures (via Entrainment and Expression). The core cross-modal process is about *how dance phrases align with musical phrases* to create combined choreomusical structures, which themselves are affectively modulated by cues for emotional expression.

SpREE is an offshoot of my general conception of the interrelationships among the arts. More specifically, I have developed a scheme that describes three types of relationships among artforms: sharings, parallels, and interactions [2,22,23]: 1) two artforms demonstrate sharings if they are underlain by the *same* neurocognitive mechanism (e.g., meter in poetry and music); 2) two artforms demonstrate parallels if they are underlain by distinct but *analogous* mechanisms (e.g., syntax in poetry and music); and 3) artforms demonstrate interactions when their domain-specific features combine to create *hybrid* artforms (e.g., setting poetry to music to create a song).

Space. The Space dimension of SpREE is about the domain-specific structural features of dance and music, respectively: choreographic structures in dance (kinemes, morphokines, ref. [24]) and melodic/harmonic structures in music. There are *parallels* between these structures. For example, music's one-dimensional pitch space (i.e., high vs. low pitch) is analogous to the vertical dimension of dance's physical space. In addition, multi-person dances can have "textures" analogous to the choral textures of music. For example, all of the dancers in a line dance move in "unison" by producing the same movement pattern, analogous to how all of the singers in a unison chorus produce the same melodic line. Overall, the Space dimension of SpREE encompasses a) the choreographic patterns of the dancers, b) the musical patterns of the musicians, and c) the textures that emerge in each domain when multiple performers combine their parts to create group-level spatial patterns (e.g., the square of a square dance, the polyphonic texture of a musical ensemble).

Figure 1



The SpREE framework for analyzing the choreomusical relationship. SpREE is based on the four choreomusical dimensions of Space, Rhythm, Entrainment, and Expression. Cyan boxes refer to dimensions that are analyzed separately for dance and music. whereas dark blue boxes refer to dimensions that are analyzed interactively and cross-modally for dance and music.

Rhythm. The Rhythm dimension of SpREE analyzes how the Space components of dance and music unfold over time. It is a *sharing* of timing mechanisms between dance and music [2]. Rhythm in both dance and music is based on the patterning of inter-onset intervals (IOI's) between successive events, such as kinemes in dance and pitches in music. The simplest example of such a timing pattern is an isochronous rhythm in which all of the IOI's are equal, as seen in a ticking clock. Most rhythms in dance and music are more complex than this and consist of "metrical hierarchies" in which certain beats have prominence over others and in which shorter beats constitute sub-beats of longer beats [25–28]. Importantly, the combination of Space and Rhythm permits the formation of *phrase structures* in dance and music individually, which serve as the basis for the Entrainment and Expression analyses that link these two domains together in the next steps (see Figure 1).

Entrainment. The Entrainment dimension of SpREE is about how the Space and Rhythm elements of dance come to be associated with the Space and Rhythm elements in the music. In situations where dance is choreographed to pre-composed music, as in many dances, this can be thought of most simply as *an alignment of dance phrases to musical phrases* to create multimodal choreomusical phrases. In a waltz, for example, the basic 3-step pattern of the dance is aligned in time with the 3-beat rhythmic pattern of the music. However, this type of coupling represents an extreme where dancers "dance to" the music. In other forms of dance, such as modern dance, this coupling can be far looser such that the dancers do not synchronize their movements with the musical beats, creating a much less precise choreomusical relationship. Next, dancers, in addition to entraining to the music, entrain to one another mutually using visual and haptic cues [29,30], and musicians entrain to one another mutually using acoustic and visual cues [31]. These mechanisms of mutual entrainment allow performers within each domain to

make ongoing adjustments to one another over the course of their performance, employing a diversity of leader/follower dynamics [31−35]. Overall, the Entrainment dimension of SpREE consists of a) cross-modal alignment between dance phrases and musical phrases (when it does indeed occur), b) mutual entrainment among the dancers, and c) mutual entrainment among the musicians.

Expression. The Expression dimension of SpREE deals with cross-modal mechanisms of emotional expression that modulate the structural features of Space and Rhythm in dance and music. Dance and music are both expressive languages, and their affective cues generally work in a mutually-reinforcing manner across movement and sound. Expressive mechanisms that are spatial in nature are based on cross-modal *parallels*: high-pitched music is associated with elevated body postures, and loud music is associated with expansive body movements. Expressive mechanisms that are rhythmic in nature are based on *sharings*: fast tempo in music is associated with fast tempo in dance, and a staccato articulation in music is associated with disconnected, staccato-like movements in dance. Hodgins [7] provides an insightful analysis of the choreomusical relationship based on what he calls "choreomusical equivalents" that cover most of the expression factors mentioned here (see also ref. [8]).

Dance classification

The SpREE framework should be useful as a tool for classifying dances cross-culturally along parameters derived from its four dimensions. One of the few precedent schemes for classifying dance-forms is Alan Lomax's [4] "choreometric" scheme that he initially used in a pilot analysis of 17 genres of world dance. This scheme was developed in collaboration with Irmgard Bartenieff, who herself was a disciple of the influential dance theorist Rudolf Laban [36]. As a result, choreometrics incorporated methods for analyzing dance movement derived from Laban's general system for analyzing the spatiality of body movement. As such, its analytical focus is limited to dance alone and does not consider the choreomusical relationship. In addition, choreometrics is basically restricted to what I am calling the Space dimension of dance − for example, the active joints and the energetics of the dance movements − and does not examine what we would think of as dance choreography per se, nor does it consider rhythmic patterns.

In contrast to this, I envision SpREE as analyzing the *phrase structures* of the dance and the music for any given genre, as carried out by analysts capable of identifying these structures in the dance and music, respectively. For dance, this would include the choreographic patterns of each dancer vis-à-vis the "movement language" of the dance. For example, salsa dancing is comprised of a large repertoire of stepping patterns and body rotations that get improvisationally linked together in a combinatoric manner during the dance. As mentioned earlier, multi-person dances like salsa have "textures" analogous to choral textures in music. Salsa dancers do much of their dancing in a face-to-face configuration and thus engage in mirror-image movement patterns much of the time, although this symmetry is often broken by body turns done by one partner at a time.

I call SpREE a "framework" because I have not yet worked out a full classification scheme for analyzing its Space, Rhythm, Entrainment, and Expression parameters in the systematic way that Bartenieff and Lomax did for their parameters of interest in choreometrics. Doing so will involve a great deal of collaborative work by researchers working on a wide diversity of dance genres across the world. However, once such a scheme is developed and validated, the process of classifying dance forms and their musics along these parameters should make it possible to devise a *multidimensional choreomusical space* for visualizing and quantifying the diversity of dance styles across human cultures. Examining a selection of highly contrastive dance styles in a corpus of world dance genres should allow analysts to flesh out the structure of this choreomusical space and discover key dimensions along which dance styles vary on a global scale. The overall aim would be to determine if SpREE is able to capture significant spatiotemporal and cross-modal relationships between dance and music across contrastive styles of dancing in a global sample of dance genres.

Conclusions

Dance, in most cases, is a hybrid artform in which body movement is coordinated in some manner with music. Despite this intertwined relationship, dance and music are typically analyzed in isolation from one another. The exploratory SpREE framework that I am proposing here connects dance and music in a more comprehensive and systematic manner than has been attempted previously. This includes a consideration of shared and parallel features, and the manners in which dance and music interactively align with one another (when they do). Conceiving of dance and music as a unified human experience should enhance our understanding of performance traditions across cultures, as well as our understanding of clinical interventions that are predicated on the interaction between dance and music. Ultimately, this work should shed light on how body movement and sound are able to condition one another in human behavior. This happens not only in dance, but in speech communication as well, where speech and co-speech gesturing reinforce one another to convey shared meanings [37,38].

Credit author statement

S.B. conceived of and wrote this paper.

Declaration of competing interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

I am grateful to Dan Cameron, Thomas MacGillavry, Giacomo Novembre, and Félix Bigand for critical comments on the manuscript. This work was funded by a grant from the Social Sciences and Humanities Research Council (SSHRC) of Canada.

Data availability

No data was used for the research described in the article.

References

References of particular interest have been highlighted as:

* of special interest
** of outstanding interest

1. Sachs C: *World history of the dance*. New York: W.W. Norton & Company; 1937.
2. Brown S: *The unification of the arts: a framework for understanding what the arts share and why*. Oxford: Oxford University Press; 2022.
3. Hanna JL: *To dance is human: a theory of nonverbal communication*. Chicago: University of Chicago Press; 1979.
4. Lomax A: *Folk song style and culture*. Washington, DC: American Association for the Advancement of Science; 1968.
5. Brown S: **Group dancing as the evolutionary origin of rhythmic entrainment in humans**. *New Ideas Psychol* 2022, **64**, 100902, https://doi.org/10.1016/j.newideapsych.2021.100902.
6. Fitch WT: **Dance, music, meter and groove: a forgotten partnership**. *Front Hum Neurosci* 2016, **10**:64, https://doi.org/10.3389/fnhum.2016.00064.
7. Hodgins P: *Relationships between score and choreography in twentieth-century dance: music, movement and metaphor*. Lewiston, NY: Edwin Mellen Press; 1992.
8. Mason PH: **Music, dance and the total art work: choreomusicology in theory and practice**. *Res Dance Educ* 2012, **13**:5–24, https://doi.org/10.1080/14647893.2011.651116.
9. Jordan S: **Choreomusical conversations: facing a double challenge**. *Dance Res J* 2011, **43**:43–64.
10. * Brown S: **The performing arts combined: the triad of music, dance, and narrative**. *Front Psychol* 2024, **15**, 1344354, https://doi.org/10.3389/fpsyg.2024.1344354.
11. Hanna JL: **Is dance music? Resemblances and relationships**. *World Music* 1982, **24**:57–71.
12. Hodgins P: *Relationships between score and choreography in twentieth-century dance: music, movement and metaphor*. Lewiston, NY: Edwin Mellen Press; 1992.
13. Jordan S: **Choreomusical conversations: facing a double challenge**. *Dance Res J* 2011, **43**:43–64.
14. Mason PH: **Music, dance and the total art work: choreomusicology in theory and practice**. *Res Dance Educ* 2012, **13**:5–24, https://doi.org/10.1080/14647893.2011.651116.
15. Schröder J: **Experimental relations between music and dance since the 1950's**. In *Music-dance: sound and motion in contemporary discourse*. Edited by Veroli P, Vinay G, London: Routledge; 2018:141–156.
16. Bryson N: **Cultural studies and dance history**. In *Meaning in motion: new cultural studies of dance*. Edited by Desmond JC, Durham, NC: Duke University Press; 1997:55–77.
17. Madison G: **Experiencing groove induced by music: consistency and phenomenology**. *Music Percept* 2006, **24**:201–208.
18. Aguiar LPC, Da Rocha PA, Morris M: **Therapeutic dancing for Parkinson's disease**. *Int J Gerontol* 2016 Jun 1, **10**:64–70, https://doi.org/10.1016/j.ijge.2016.02.002.
19. Dhami P, Moreno S, DeSouza JFX: **New framework for rehabilitation - fusion of cognitive and physical rehabilitation: the hope for dancing**. *Front Psychol* 2015, **5**:1478, https://doi.org/10.3389/fpsyg.2014.01478.
20. Hasan SM, Alshafie S, Hasabo EA, Saleh M, Elnaiem W, Qasem A, *et al*.: **Efficacy of dance for Parkinson's disease: a pooled analysis of 372 patients**. *J Neurol* 2022 Mar 1, **269**:1195–1208, https://doi.org/10.1007/s00415-021-10589-4. PubMed PMID: 33966112.
21. Hackney ME, Earhart GM: **Effects of dance on movement control in Parkinson's disease: a comparison of Argentine tango and American ballroom**. *J Rehabil Med* 2009, **41**:475–481, https://doi.org/10.2340/16501977-0362. PubMed PMID: 19479161.
22. Brown S, Cameirao J: **Toward a new science of the clinical uses of the arts**. *Open Psychol* 2023 May 8, **5**, 20220133, https://doi.org/10.1515/psych-2022-0133.
23. Brown S: **Toward a unification of the arts**. *Front Psychol* 2018, **9**:1938, https://doi.org/10.3389/fpsyg.2018.01938.
24. Giurchescu A, Kroschlova E: **Theory and method of dance form analysis**. In *Dance structures: perspectives on the analysis of human movement*. Edited by Kaeppler AL, Dunin EI, Budapest: Akademiai Kiado; 2007:21–52. Budapest.
25. Lerdahl F, Jackendoff R: *A generative theory of tonal music*. Cambridge, MA: MIT Press; 1983.
26. Jones MR: *Time will tell: a theory of dynamic attending*. Oxford: Oxford University Press; 2019.
27. Jones MR, Boltz M: **Dynamic attending and responses to time**. *Psychol Rev* 1989, **96**:459–491, https://doi.org/10.1037/0033-295X.96.3.459. PubMed PMID: 2756068.
28. London J: *Hearing in time: psychological aspects of musical meter*. Oxford: Oxford University Press; 2012.
29. Chauvigné LAS, Walton A, Richardson MJ, Brown S: **Multi-person and multisensory synchronization during group dancing**. *Hum Mov Sci* 2019, **63**:199–208, https://doi.org/10.1016/j.humov.2018.12.005.
30. ** Bigand F, Bianco R, Abalde SF, Novembre G: **The geometry of interpersonal synchrony in human dance**. *Curr Biol* 2024 Jul 8, **34**:3011–3019, https://doi.org/10.1016/j.cub.2024.05.055. PubMed PMID: 38908371.
31. Goebl W, Palmer C: **Synchronization of timing and motion among performing musicians**. *Music Percept* 2009, **26**:427–438.
32. Keller PE: **Ensemble performance: interpersonal alignment of musical expression**. In *Expressiveness in music performance: empirical approaches across styles and cultures*. Edited by Fabian D, Timmers R, Schubert E, Oxford: Oxford University Press; 2014:260–282.
33. Keller PE, Novembre G, Hove MJ: **Rhythm in joint action: psychological and neurophysiological mechanisms for real-time interpersonal coordination**. *Phil Trans Biol Sci* 2014, **369**, 20130394, https://doi.org/10.1098/rstb.2013.0394.
34. Knoblich G, Sebanz N: **Evolving intentions for social interaction: from entrainment to joint action**. *Phil Trans Biol Sci* 2008, **363**:2021–2031, https://doi.org/10.1098/rstb.2008.0006. PubMed PMID: 18292061.

35. Knoblich G, Butterfill S, Sebanz N: **Psychological research on joint action: theory and data**. *Psychol Learn Motiv* 2011, **54**: 59–101.

36. Laban R: *The mastery of movement*: *Revised by Lisa Ullman*. Hampshire, UK: Dance Books; 1950.

37. McNeill D: *Gesture and thought*. Chicago: University of Chicago Press; 2005.

38. * Berry M, Lewin S, Brown S: **Correlated expression of the body, face, and voice during character portrayal in actors**. *Sci Rep* 2022, **12**:8253, https://doi.org/10.1038/s41598-022-12184-7. PubMed PMID: 35585175.

Further information on references of particular interest

10. * Presents a theoretical discussion of the relationships among the performing arts, including dance and music.

30. ** Presents a groundbreaking quantitative analysis of interpersonal synchrony during improvised dyadic dancing, examining the relative roles of music and visual contact in this synchrony.

38. * Presents a quantitative analysis of the cross-modal relationship among the voice, face, and body during expressive production in professional actors.