
Imagery in Dance

A Literature Review

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Abstract

Dance imagery is a consciously created mental representation of an experience, either real or imaginary, that may affect the dancer and her or his movement. In this study, imagery research in dance was reviewed in order to: 1. describe the themes and ideas that the current literature has attempted to illuminate and 2. discover the extent to which this literature fits the Revised Applied Model of Deliberate Imagery Use. A systematic search was performed, and 43 articles from 24 journals were found to fit the inclusion criteria. The articles were reviewed, analyzed, and categorized. The findings from the articles were then reported using the Revised Applied Model as a framework. Detailed descriptions of Who, What, When and Where, Why, How, and Imagery Ability were provided, along with comparisons to the field of sports imagery. Limitations within the field, such as the use of non-dance-specific and study-specific measurements, make comparisons and clear conclusions difficult to formulate. Future research can address these problems through the creation of dance-specific measurements, higher participant rates, and consistent methodologies between studies.

Imagery has been a topic of research in dance for the past several decades. Scientists and dancers alike have been interested in how an image created in the mind can affect the creator. Due to varying methodologies and the sporadic nature of the literature, however, it remains difficult to find answers and make comparisons. How, exactly, is imagery in dance to be understood: is it merely a means of rehearsal or can it enhance performance and creativity? Can it affect psychological aspects of the individual, such as self-confidence? How do dance imagery and dance imagery research differ from what occurs in sport and other fields? What themes and ideas has the current literature attempted to understand and illuminate? A thorough review of the literature may provide answers to these and other questions.

The research that has attempted to tackle these questions is somewhat varied, and comes not only from the field of dance science, but also its close relative, sport psychology. The definitions used for imagery also vary,

yet in dance, imagery is commonly defined as an intentional mental representation of motor skills used either without or in combination with physical movement.¹ The dancer pictures the movement in her head for the sake of practicing it. In this manifestation, imagery is only focused on movement—usually movement that the dancer is learning or has already performed. This specific type of imagery is known as “mental rehearsal” or “imagery rehearsal” because it allows the dancer to rehearse the motor skills necessary for performance.² While this definition does cover a large portion of the imagery used by dancers, it is not all-inclusive. It has been reported that dancers use additional types of imagery, such as metaphorical.³ Because of this distinction, a broader definition is needed for imagery in dance science. Nordin and Cumming⁴ adapted this definition from sport research: “Imagery is an experience that mimics real experience or approximates a desirable sensation. We can be aware of ‘seeing’ an image, feeling movements as an image, or experiencing an image of smell, taste or sounds without experiencing the real thing. Sometimes people find that it helps to close their eyes. It differs from dreams in that we are awake and conscious when we form an image.”

This definition opens the door to including imagery of scenarios that may not exist in the real world, such as metaphors. Although it differs

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from previous examples, the gist is that the dancer is creating the image consciously and that it is a mental representation of an experience, either real or imaginary. These commonalities create a shared theme on which research in imagery can be based.

Imagery is considered to be pervasive and elemental in dance training, technique, and performance⁴; consequently, the literature is full of references to imagery and its uses.⁵⁻⁷ These writings cover everything from beliefs about dance education to experimental research into the performance of dance movement. Presumably its pervasiveness is due to a belief that imagery can help students learn movement and improve technique.⁸⁻¹⁷ A teacher may use a metaphor to help students dance with a certain quality, or she may encourage her students to imagine performing the movement so as to remember it correctly. Additionally, research has shown that imagery can enhance the performance of dance movements when used while dancing.^{10,18-24} It may be that performers frequently incorporate imagery into their dancing not only because they have been encouraged to do so but also because it is seen as a way to enrich movement.

Any image can be used to inspire artistry, which may be the most prominent use for imagery in dance. Dancers use imagery, most commonly metaphorical imagery, to create movement.^{2,12,22,25-27} This type is employed during improvisation, creation of choreography, and performance, and while some may believe that it mostly inspires adults in the professional world, students of all ages can benefit from inventive dance imagery.^{16,17,28,29}

Until recently, the study of imagery in dance was almost solely focused on how it could be used to teach, learn, and perform movement. There is a firm belief that skill acquisition and development is the key role of imagery in dance.⁹ In the last 10 years, however, researchers have begun to look at imagery in a new light. The sports psychology world has been investigating imagery in relation to self-esteem and self-confidence. For

example, there is evidence to suggest that certain types of imagery are positively linked to self-confidence in athletic training and competition.^{30,31} Dance psychology researchers have begun to build on this research and have found imagery to be associated with key psychological factors, such as self-confidence.^{13,30} Imagery, it is now thought, may not only help dancers hone their physical craft but also their psychological states.

Sport psychologists have extensively defined sports imagery and created frameworks that can be applied to dance. Munroe and colleagues³² reviewed the research and then conducted interviews in order to accurately depict the “4 Ws” of imagery use in sport: *Where*, *When*, *Why*, and *What*. *Where* described the location at which the imaging took place while *When* described the timing.³² *Why* dealt with the functions the imagery served for the athletes, and *What* covered the types of imagery described. In 2013, Cumming and Williams,³³ building upon previous research in the field,^{30,32} produced the Revised Applied Model of Deliberate Imagery Use for use in sport, dance, exercise, and rehabilitation. This updated model includes the Munroe categories but adds those of *Who* (the individual imaging) and *How* (as in how it is experienced).³³ It then goes on to explain how personal meaning and imagery ability influence these categories to effectively reach a desired outcome.³³ This model could benefit dance researchers by providing a comprehensive overview of important facets of imagery.

The study of imagery in dance appears to be at somewhat of a crossroads. Although several studies have been performed and much has been written, there is limited cohesion on this subject. Often dance studies are conducted without taking into account the wealth of information from sport research.³ Similarly, images that are used in one intervention are not used in later studies, and calls for future research go unheeded. The discipline has reached a point where an overall review of the literature is necessary. By utilizing the Revised

Applied Model of Deliberate Imagery Use³³ as an illustrative framework, this review will describe what has been put forth by the current literature so that dance researchers can effectively view the past and shape the future. In doing so, we hope to answer two questions. Firstly, what themes and ideas has dance imagery literature attempted to illuminate to date? Secondly, to what extent does this literature fit the Revised Applied Model of Deliberate Imagery Use³³ or depart from it?

Method

A systematic search was performed following the methods used by Goodger and coworkers,³⁴ Lewis and Johnson,³⁵ and Cooley and associates.³⁶ The search, using the terms “dance” and “imagery,” was conducted through the internet search engines SPORTDiscus, SIRC, HighBeam Research, Athens, Discovery, and Google Scholar. As a point of reference, the search on SPORTDiscus, conducted on March 10, 2015, produced 90 articles. The abstracts of these articles were read to ascertain their relevancy to this study. Next, the cited reference lists of the found articles were explored. The *Journal of Dance Medicine and Science*, *Kinesiology and Medicine for Dance*, *Journal of Physical Education, Recreation, and Dance*, and *Journal of Mental Imagery* from January 1, 1987, to March 10, 2015, were all hand-searched because the focus of these journals relates closely to the topic of this review. January 1, 1987, was chosen as the starting date because no published articles on imagery were found prior to that year in any of the previous searches.

Articles were deemed relevant if the topic of study was not only dance but imagery as well; both topics needed to be the focus of the research for the article to be included. Although imagery is considered an integral part of many somatic techniques,³⁷ it is not often studied as its own entity in somatic research. Consequently, items discussing “somatics” and the mind-body connection without specifically discussing dance imagery were excluded. Research that was based

on observation and experimentation, i.e., empirical work, was included while articles that were solely focused on theories or beliefs were not. Only articles published in English and those that the researchers could physically obtain (either online or in hardcopy) were included. Finally, only articles from peer reviewed journals were chosen for inclusion because this system produces a high standard of scientific research.³⁸

The articles were reviewed, analyzed, and categorized into six general topics based on the Revised Applied Model of Imagery Use³³: Who, When and Where, What, Why, How, and Imagery Ability. Organization of data into “W”-style groupings has been used in related fields, such as sports and exercise,^{32,39} and was, therefore, felt to be a comparable and useful means of classification. The Revised Applied Model³³ was chosen as a structure for the results as it offers additional categories, giving a fuller picture of dance imagery. *Who* is the individual performing the imaging. *When and Where* refers to the location of the imaging as well as the timing (e.g., in the studio, before class, during performance on stage). *What* describes the type or content of the imagery used while *Why* relates to the function the imagery serves for the imager. *How* details how the image is experienced, such as its speed, duration, sensory modalities involved, and visual perspectives. It also includes how imagery is created in dance. *Imagery Ability* is the proficiency with which an individual can create, control, and maintain images.

The data were further sorted into three research types: analytical, descriptive, and experimental. This type of classification was used by Nemecek and Chatfield³⁸ in their summary of teaching and technique research in dance. It allows the reader to note the methodologies used within each study, thus clarifying the reasons for research and highlighting how conclusions were reached. Note that the term “analytical” here refers to research that collects quantitative and qualitative data along with expert opinions in

order to formulate conclusions; it does not indicate that the investigators have applied statistical analyses to data. Both qualitative and quantitative data-driven studies are categorized as “descriptive.” The main points and findings from each article were discussed and related to one another, as well as to the field as a whole. Finally, specific topics for future research were provided.

Results and Discussion

Forty-three articles containing 48 studies were found to satisfy the inclusion criteria. The articles were published in 24 journals between 1990 and 2014 and included a total of 2,888 participants (Table 1). It should be noted that participants were only counted once, though they may have been included in more than one study.

Who

Much of the research on imagery in dance has focused on *who* exactly uses imagery. The conclusions are varied, but a central theme does emerge: dancers of all ages and levels use imagery.^{4,8,13,40-45} From young children to university students, from professionals to retired recreational enthusiasts, these groups all use imagery as a tool to enhance their dancing in some way. As the skill level of the dancer grows, so too does her relationship with imagery. More experienced dancers reported imaging more frequently than their lower level counterparts.^{4,13,40-43,46,47} It may be that the longer a dancer dances, the more she uses imagery; alternatively, imaging may be related to dancing intensity (investment). The intricacy of the imagery employed also seems to increase as dancers gain proficiency in their art. Higher level dancers described more complex images, involving layers of senses, which were then used with more deliberation.⁴¹⁻⁴³ These dancers appear to use their images purposefully to support their dance performance in ways that novice dancers perhaps have not yet learned. In sport, it has been postulated that successful use of motor imagery comes

only after the athlete has a developed mental representation of the task.^{48,49} As skill in the field grows, the athlete’s mental representations become richer, leading to stronger motor imagery. It is likely that proficient dancers experience a similar effect, leading to more complex and frequent imagery.

When describing dancer imagery, comparisons do not always follow the lines of experience. On occasion, the divisions center more on dancer age. This is the case with debilitating imagery, e.g., imagining oneself falling or being hurt, which older dancers reported experiencing significantly less often than younger performers in one study.⁴⁴ This may be related to the additional opportunities older dancers have garnered by being in the field longer. In the same study, no significant difference was found between the amount of debilitating imagery reported by academic, vocational, or professional dancers.⁴⁴ This same study further suggested that debilitating imagery appears to be something that is experienced by many dancers, especially those with perfectionistic tendencies,⁵⁰ and may as such warrant further research.

How, then, do dancers compare to athletes when it comes to imagery use? Although little research has been done in this area, some comparisons can be made. One study indicates that dancers seem to use imagery more than athletes, including more images of roles and movements, technique, and goals.¹³ These differences in imagery quantity mirror the differences reported between dance teachers and coaches; dance teachers describe using more kinesthetic imagery than coaches during training.¹⁴ In fact, the imagery used by teachers and coaches seems to differ not just in the amount used but also its purpose. While both groups employ imagery to enhance performance, dance teachers include imagery focused on augmenting their students’ technique and creativity.^{14,27} Thus, dance teachers appear to use imagery more extensively than athletic coaches.

Both dance teachers and students report that teachers use imagery

Table 1 Articles Reviewed

Study	Type of Study	Dance Style	Demographic Data	Who, What, Why, Where, How, & Ability
Afremow, Overby, & Vadocz (1997) ¹	Analytical	-	-	What & How
Hanrahan & Vergeer (2000) ²	Descriptive	Modern	7 females, 4 males	What, Why, When, & How
Nordin & Cumming (2005) ³	Descriptive	Ballet, contemporary, and kathak	9 females, 5 males	Who, What, Why, When, How, & Ability
Nordin & Cumming (2006) ⁴	Descriptive	25 dance styles, mostly modern, ballet, and jazz	410 females, 91 males	Who, What, & Why
Nordin & Cumming (2006) ⁴	Descriptive	16 dance styles, mostly modern, ballet, and ballroom	249 females, 65 males, 3 unspecified	Who, What, & Why
Nordin & Cumming (2006) ⁴	Descriptive	15 dance styles, mostly modern and ballet	218 females, 27 males, 5 unspecified	Who, What, & Why
Bolles & Chatfield (2009) ⁸	Descriptive	Ballet and modern	31 females, 3 males	Who, Why, How, & Ability
Fish, Hall, & Cumming (2004) ⁹	Descriptive	Ballet	18 females, 24 males	What & Why
Hanrahan, Tétreau, & Sarrazin (1995) ¹⁰	Experimental	Modern, ballet, and other	60 females, 5 males	When & Why
Nordin & Cumming (2008) ¹³	Descriptive	Ballet, street dance, contemporary, disco, tap, Brazilian, jazz, ballroom, Irish, etc.	265 females, 3 males	Who, What, & Why
Overby, Hall, & Haslam (1998) ¹⁴	Descriptive	Dance, figure skating, and soccer	35 females, 14 males	Who & How
Sawada, Mori, & Ishii (2002) ¹⁶	Experimental	Unspecified	30 females, 30 males	Why
Sacha & Russ (2006) ¹⁷	Experimental	Ballet	32 females	Why
Couillandre, Lewton-Brain, & Portero (2008) ¹⁸	Experimental	Ballet	7 females	Why & When
Gamboian, Chatfield, & Woollacott (2000) ¹⁹	Experimental	Jazz and ballet	6 females	Why & When
Gamboian, et al. (1999) ²⁰	Experimental	Jazz, ballet, and modern	3 females	Why & When
Girón, McIsaac, & Nilsen (2012) ²¹	Experimental	Ballet	3 females	Why & When
Hanrahan & Salmela (1990) ²²	Experimental	Not specified	15 dancers (gender not specified)	Why & When
Heiland, Rovetti, & Dunn (2012) ²³	Experimental	Not specified	18 females	Why & How
Krasnow (1997) ²⁴	Analytical	-	-	Why & When
Hanrahan, (1995) ²⁵	Analytical	-	-	How
Overby (1990) ²⁶	Descriptive	Dance and physical education	44 dance teachers (gender not specified)	Who

Continued on next page

during class as a teaching tool.^{3,26,41} Imagery may be used to emphasize the quality of, or bring attention to, a specific movement while at other

times teachers use it to describe the execution of a step. As the experience level of the class rises, so too does the imagery level. Teachers increase

the frequency and complexity of the imagery offered to their students as they become more skilled.^{42,43} Imagery becomes an integral part of the stu-

Table 1 *Continued*

Study	Type of Study	Dance Style	Demographic Data	Who, What, Why, Where, How, & Ability
Overby (1990) ²⁶	Descriptive	Not specified	1 dance teacher (gender not specified)	Who
Vaccaro (1997) ²⁷	Experimental & Analytical	Ballet	1 male	Who, Why, & How
Hanrahan (1994) ²⁸	Descriptive	Modern	60 females, 5 males	Why, When, & How
Bradley & Partington (1997) ⁴⁰	Descriptive	Highland dance	60 females	Who
Nordin & Cumming (2006) ⁴¹	Descriptive	Ballet, contemporary, and kathak	9 females, 5 males	Who & How
Nordin & Cumming (2006) ⁴²	Descriptive	Modern, ballet, ballroom, kathak, flamenco, tap, jazz, salsa, bharatnatyam, ceroc, street, Irish dance, & bollywood	218 females, 27 males, 5 unspecified	Who & How
Nordin & Cumming (2007) ⁴³	Descriptive	Ballet, contemporary, Indian, ballroom, flamenco, tap, jazz, and other	218 women, 27 men, 5 unspecified	Who & When
Nordin-Bates, et al. (2011) ⁴⁴	Descriptive	Contemporary, jazz, ballet, hip hop, Indian, Latin/ballroom, tap, & disco	178 females, 38 males	Who & When
Overby (1990) ⁴⁵	Descriptive	Modern & ballet	40 females	Who & Ability
Karageorghis, Smith, & Priest (2012) ⁴⁶	Experimental	Break dance	20 males	Who, What, & How
Monsma & Overby (2004) ⁴⁷	Descriptive	Ballet	131 females	Who, What, & Why
Nordin-Bates, et al. (2011) ⁵⁰	Descriptive	Ballet & contemporary	166 females, 59 males, 25 unspecified	Who & Why
Vergeer & Hanrahan (1998) ⁵¹	Descriptive	Modern	4 males, 7 females	What, Why, & How
May, et al. (2011) ⁵⁴	Descriptive	Contemporary	4 males, 4 females	Why, When, & How
Same authors as above ⁵⁴	Descriptive	Contemporary	1 female	Why, When, & How
Minton (1996) ⁵⁶	Descriptive	Jazz and modern	7 teachers (gender not specified)	Why
Golomer, et al. (2008) ⁵⁸	Descriptive	Ballet	7 females	Why & Ability
Krasnow, et al. (1997) ⁵⁹	Descriptive & Experimental	-	19 dancers (gender not specified)	When
Heiland & Rovetti (2013) ⁶⁰	Experimental	Ballet	11 females, 2 males	Why & When
Overby & Dunn (2011) ⁶¹	Descriptive	-	-	Why, When, & How
Goldschmidt (2002) ⁶²	Analytical	-	-	When, Why, & How
Batson (1994) ⁶⁹	Analytical	-	-	When
Olshansky, et al. (2014) ⁷¹	Experimental	Breakdance	1 male	How
Thwaites, McKelvie, & Stout (2007) ⁷⁷	Descriptive	Dance, volleyball, and swimming	114 females, 13 males	Ability
Di Corrado, Guarnera, & Quartiroli (2014) ⁷⁸	Descriptive	Ballet	90 females	Ability

dent's training as she becomes more capable. In recent research, higher level students felt that teachers had encouraged them to use imagery.^{8,42,43}

Thus, in addition to receiving imagery during class, these students were urged by teachers to create and incorporate imagery into their practice.

What

In order to fully discuss what dancers image, it behooves the research community to utilize a categorization

scheme that fully encompasses the many types of imagery found within dance. The most complete system to date was created for the Dance Imagery Questionnaire (DIQ).⁴ Similar to categorizations used in sport and exercise, it details four types of imagery used in dance. Each type of imagery can serve several different functions for a performer. Technique imagery, sometimes referred to as direct imagery, describes mental rehearsal of movements or sequences.^{1-4,9,13,46,47,51} This type of imagery occurs when a dancer imagines specific dance movements or phrases of movement. Mastery imagery is related to planning, controlling anxiety, and staying focused.^{2-4,9,13,46,47} Dancers may, for instance, image themselves remaining confident and focused during an audition. These images are often associated with arousal and motivation. Goal imagery covers images of working toward and reaching dance-related goals.^{3,4,9,13,47} For example, a goal image could consist of walking off stage to roaring applause after a flawless performance or images of achieving one's goal of increased external hip rotation. Finally, role and movement quality imagery not only includes images of roles and characters, but also most metaphorical, or indirect, imagery.^{1-4,13,51} Images of how a character within a ballet might feel or of a dancer's arms turning into wings would both fall into this category. Researchers have found that dancers use technique imagery the most, while mastery imagery is utilized the least.^{4,13} Interestingly, this is contrary to findings in sport. Athletes report using mastery-type imagery most frequently out of the five types of imagery described in sport literature.^{52,53} As in dance, this type of imagery consists of imaging oneself as focused and confident, which could be quite useful in competitive situations, a common occurrence in sport. However, the dance world is full of similar situations, such as auditions, so the sparseness of this imagery type in the dance community is of concern. It could be that dancers do not necessarily use mastery imagery less than athletes but rather image

the other types more. Regardless, as mastery imagery has been associated with higher self-confidence and lower anxiety,^{4,9,13,47} it would be valuable to examine the potential effects of helping dancers use more mastery imagery.

Why

Imagery serves various functions for dancers, with an image often acting in more than one capacity at a time. For example, a single technique image, say dancers completing a section of a piece, can allow an artist to picture spatial relationships while simultaneously stimulating creativity and helping to plan the next steps. Choreographers describe using various types of imagery to inspire movement ideas as well as to problem-solve within a piece.^{2,3,54} In their 2012 study, May and colleagues⁵⁴ described the imaging methods used during the creative process by choreographer Wayne McGregor and his company. The dancers reported that their chosen images drove their movement choices and that those images were drawn from abstract ideas, the space around them, and their own bodies.⁵⁴ The images these dancers used helped them create and enhance movement, choose where in the space to move, and sort the sequence of the dance.

For practitioners, imagery is often used to shape movement. Similarly, dancers consistently report using imagery for the specific purpose of enhancing their movement,^{2,3,24,51} such as using images of strong emotions to lend a dramatic element to a performance or detailed anatomical images to increase jump height or improve posture. In fact, several somatic techniques have been developed and employed in dance practice for precisely this purpose. Created by Dr. Lulu Sweigard, ideokinesiology is based on the idea that imagery can improve skeletal alignment and posture through the re-patterning of neuromuscular pathways in the absence of overt movement.^{6,12,27,28,55,56} The Franklin Method is a somatic-based system that focuses on imagery use to improve body function⁵⁷; these images are recommended for use by

dancers and teachers at all levels.⁵⁸ The images and tenets from these two somatic techniques, as well as others, have served as the basis for recent imagery interventions. Such research has shown that, in specific situations and for specific steps, imagery does have a measurable effect on dance movement.^{10,18-23,59,60} These findings underscore the efficacy of utilizing imagery as a means to enrich performance. Unfortunately, several of these intervention studies suffered from internal limitations, such as low dancer participation, un-tested evaluation measures, and a lack of manipulation checks. Therefore, these findings should be read with caution. Further discussion of the issues facing this aspect of the field are discussed in the Limitations section of this paper.

Interestingly, several intervention studies have suggested that dancers do not always realize when an image is effective. Heiland and associates²³ gave participants visual, kinesthetic, and auditory images based on the Franklin Method for use during a plié arabesque. They found that while using a metaphorical image, 100% of the dancers who had not improved their performance believed they had, and 60% of the dancers who had improved believed they had not. Gamboian and coworkers,¹⁹ Hanrahan and Salmela,²² and Hanrahan and colleagues¹⁰ all reported similar findings when using imagery based on ideokinetic principles. These studies highlight not only the importance of obtaining feedback from participants on their experiences but also the need for outside feedback regarding performance improvement while using imagery.

In the classroom, students report that teachers use images to clarify movement or express thoughts and feelings that should accompany movement.^{3,8} Often it is metaphorical (role and movement) imagery that is used and studied as a means to effect movement. However, it may not be the only type of imagery that can serve this function. Mental rehearsal-style (technique) imagery can also help dancers understand and reinforce movement in their memory and body.^{2,3,8,16,17,61,62}

By reviewing a phrase or move as an image in the mind, the dancer is effectively seeing or feeling it, giving herself more time to analyze and learn it. Sports psychology research consistently reports that imagery training interventions have had positive effects on athletic movement.⁶³⁻⁶⁵ Unfortunately, research regarding this process, such as an experimental study into potential effects of a mental training intervention, is lacking in dance. More generally, it is interesting to note that, to date, sport imagery interventions have all been focused on mental rehearsal-style imagery while all dance imagery interventions have focused on metaphorical imagery.

In addition to movement enhancement, imagery serves many other functions between the classroom and the stage. For instance, dancers report using imagery to inspire strong emotions, lower arousal, and mentally prepare to walk onstage.^{2,3,9,51} Images of this nature serve to prime the dancer for optimal performance, in very much the same way as has been found in sports.^{52,53,66} Moreover, imagery is used to regulate mood and motivation levels, often easing anxiety or helping a dancer stay positive during difficult situations,^{2,3,9,51} such as auditions, a demanding performance, or even a time of injury.

As noted above, dance researchers have begun to explore the relationships between imagery, anxiety, and self-confidence.^{9,47,50} In addition to using imagery to manage anxiety, dancers use it to enhance their self-confidence.³ A dancer can create and use an image specifically designed to help her feel more self-assured, and higher instances of mastery imagery have been linked to higher levels of dancer self-confidence.^{4,9,13,47} Similar results have been reported in sport, with research linking mastery-type imagery to increased self-confidence in athletes.^{31,67,68} However, there is limited research on this topic in dance, and further investigation is warranted. It is also noteworthy that in one study dancers reporting more debilitating imagery also reported greater intensities of anxiety and lower

self-confidence.⁵⁰ It seems that such images affect how positively dancers feel about themselves—or vice versa. Finally, higher frequencies of technique and role and movement quality imagery have both been associated with more facilitative interpretations of anxiety.^{4,9} Thus, dancers who imaged dance steps or metaphors were more often able to perceive their anxious feelings as helpful to their performance. In sum, it appears that imagery can have both beneficial and detrimental effects on dancer psychological wellbeing based on its type and function. While researchers are just beginning to explore these complex relationships, future studies into the diverse functions of dance imagery will no doubt prove beneficial to the dance community.

When and Where

Imagery seems to surround all aspects of training and performance, with dancers using imagery before, during, and after class, rehearsal, and performance.^{2,3,43} Imagery comes into play while an individual is learning movement, practicing it, and then as she presents that movement to an audience. As one of the most frequent instances, dancers often image before initiating movement, either in a relaxation pose or quiet stance.^{3,18-20,28,61,62,69} At these times, the dancer images with the mind, rather than attempting to incorporate the idea into movement. Additionally, performers frequently use imagery while dancing.^{2,3,10,18,21,22,24,28,43,59,61} The dancer might employ any one of the four types of imagery described above as she performs, separately or together, the mind imaging in concert with the moving body. In fact, it is this timing of imagery that seems to set dance apart from other physical activities: at least if the sport psychology literature is to be believed, athletes mostly use imagery while in a static position or doing only minimal gestures. In contrast, dancers use imagery both in static and dynamic states.⁵¹ When it comes to imagery that has been specifically created to affect movement, it seems that dancers prefer

to use it while moving. Hanrahan,²⁸ Hanrahan and associates¹⁰ and May and colleagues⁵⁴ all found that the dancers they surveyed did not like being still while imaging movement, citing that it seemed counterintuitive and detracted from the effects of the previous warm-up. For dancers, imaging while dancing seems to be a part of their performance process.

Finally, it should be noted that dancers have described utilizing imagery when they are tired or injured in an effort to conserve their resources.^{3,44,61} In one study, it was reported that dancers who used imagery more while healthy also utilized imagery more frequently while injured.⁴⁴ At these times, imagery may take the place of practice while the dancer rests and recuperates.

How

Sensory Modalities

Dancers report employing their visual, auditory, gustatory, olfactory, tactile, and kinesthetic senses when imaging.^{1-3,51} In other words, dancers can see and hear an image, but they may also feel, and even taste or smell parts of an image. However, the images described by dancers appear to contain mostly visual and kinesthetic components, with the other senses utilized to a lesser degree.^{2,3,51} The visual mode is divided into internal and external perspectives. When dancers image from an internal perspective, they see the image as if through their own eyes.^{1,2,61,62} This type of imagery is most similar to the dancer's experience of performance. On the other hand, the external perspective is used when dancers imagine themselves performing the movement as if they were an audience member or watching on television.^{1,2,51,61,62} These perspectives serve different functions for a dancer.^{3,51} For example, Vergeer and Hanrahan⁵¹ explored the pre-performance routines of modern dancers in order to better understand how dancers prepare for performance. The study's participants reported using both the internal and external perspectives in tandem in order to compare their experience of the move-

ment to what an onlooker might see.⁵¹ Interestingly, recent work in sport has indicated that the perspective chosen may in fact be task-specific, with the internal perspective better supporting complex motor imagery (mental rehearsal) in elite athletes.^{48,49} This line of research could offer the dance world insight into which perspective would best bring about the desired outcome.

Imagery Creation

In the professional world, dancers create images to be used for choreography and performance. For some, imagery is triggered by an external stimulus or a memory,³ such as a picture, experience, or a song. Olshansky and coworkers⁷⁰ used brain imaging while an experienced break-dancer listened to various musical pieces to determine how the music would affect his movement imagery. The results suggested that the dancer's familiarity with the music influenced his imagery, leading to more intricate and elaborate images.⁷⁰ In other instances, the movement itself can be the instigator of an image.² During an improvisation, the dancer may stumble upon an image that provides impetus onto a new path of movement exploration. Some choreographers supply imagery instructions to their dancers during the artistic process. For instance, the dancers studied by May and colleagues were given specific instructions requiring complex mental imagery; the choreographer then observed the movement inspired by this imagery, selecting phrases for future use.⁵⁴

The creation of images for educational purposes is a popular topic within the field of dance education. Researchers recommend that teachers pre-plan their images, implementing them in an organized fashion throughout the class, and then teaching the imagery to their students in the same systematic way.^{1,25,27} Some guidelines highlight the need to infuse images with personal meaning for the imager²⁵; if the imager's feelings are not taken into account, the intended outcome may be sabotaged.³³ Instructors are advised to walk into the education setting prepared with images created

explicitly for that audience.

To ensure that guidelines are effective, it is imperative that they are derived from research not only in dance but also sport and related areas. Utilizing research in psychology, neuroscience, and sport, Holmes and Collins⁷¹ developed a checklist for motor imagery creation called PETTLEP. The acronym stands for Physical, Environment, Task, Timing, Learning, Emotion, and Perspective and was developed to help both psychologists and athletes create imagery that more closely resembles the real activity.⁷¹ The researchers postulated that the closer to reality the motor imagery is, the more beneficial it will be for the mind and body.⁷¹ The efficacy of the PETTLEP technique has been tested in multiple studies, showing that the incorporation of these factors leads to positive physical outcomes.⁷²⁻⁷⁴ In addition to this checklist, sport psychologists recommend that the 5 Ws (Who, What, When and Where, and Why) be fully explored and understood when creating imagery scripts.⁷⁵ The dance guidelines mentioned above already incorporate some of these ideas. For example, Hanrahan²⁵ emphasizes that scripts be tailored to the target audience (Who), inspire the desired emotions (Emotion), clearly target the desired movement (Task), have a clear goal (Why), as well as provide detailed content (What). However, Hanrahan's²⁵ guidelines could be made richer by incorporating more factors from PETTLEP and the 5 Ws. For example, the Physical element from PETTLEP describes, among other things, allowing small movements that mimic the task while imaging. Research has shown that adding these small movements to imagery in sport can increase physical performance by not only integrating temporal features into the imagery, but also enhancing its vividness.⁶⁴ To dancers, this type of dynamic imaging is known as "marking," and it is a common practice.³ However, it has not yet been recommended for imagery enhancement, nor has it been incorporated into interventions. It is also in stark contrast to recommenda-

tions from some dance⁶⁹ and older sport^{72,74} research, where performers are encouraged to image while physically relaxing. Though most of the principles set out by dance researchers for imagery creation focus on role and movement over technique imagery, the scripts created could greatly benefit by including the PETTLEP model and the 5 Ws. This more thorough approach would not only lead to advances in imagery creation in the lab but in the classroom as well.

Dance imagery research also advocates the allotment of designated time within the class for imagery instruction.¹ By doing so, teachers can focus on imagery and indicate to their students that it is an important part of dance. Unfortunately, most dance classes are only 1 to 1.5 hours long, with minimal time to spare for anything other than physical dance training. Consequently, if these guidelines were to be followed, designated imagery time would probably be less than 5 minutes. It is of note that in sport and rehabilitation, the recommended length of imagery training is longer than this. Cooley and colleagues³⁶ conducted a systematic review of imagery interventions in sport, and imagery duration was compared across the analyzed studies. Interventions averaged 6.5 weeks long, with a mean total imaging time of 2.45 hours.³⁶ Additionally, a positive correlation between total imagery use and intervention success was found, such that the more time an athlete spends imaging, the more positive the outcome.³⁶ Thus, even though finding the time may be difficult, it seems worthwhile for dance teachers to insert imagery sessions into their classes and encourage dancers to image outside of class to increase the total time spent imaging.

Several other suggestions have been put forth with the aim of improving dance imagery. In one recent study, Karageorghis and associates⁴⁶ used voice enhancement technology during an intervention. Participants were asked to wear headphones that not only amplified the experimenter's voice during the imagery script

but also greatly decreased ambient noise. The findings indicated that this type of enhancement led to increased frequency of imaging by the participants.⁴⁶ It was, therefore, recommended that voice enhancement technology be used by teachers to elicit increased imaging in their students.⁴⁶ While increasing imagery frequency is a worthy pursuit, it may not be monetarily feasible to equip students and teachers with this type of technology. The use of pictures to inspire or explain images has also been recommended in dance education.^{27,28} Heiland and coworkers²³ used three means to deliver the images in their study: visual (pictures), tactile (touch), and auditory (words); all three modes produced significantly improved results in the movement trials. Thus, depending on the desired outcomes and the dancers' needs, additional tools may be worth the investment, though further research is needed to explore the efficacy of such initiatives for dance education.

Despite recommendations for structured, deliberate imagery, educators and students frequently describe a different reality in the classroom, with both imagery preparation and education being unstructured and unplanned.^{8,14,41,42} Teachers seem to prefer to create images spontaneously, perhaps to adapt them better to the current needs of their students. Meanwhile, dancers may learn imaging techniques from their teachers but through observation of the teacher's imagery use rather than from a formal lesson.⁸ The discrepancy between research recommendations and the reality of imagery use in dance education indicates that more must be done to support effective imagery work in real-world contexts.

Imagery Ability

Imagery ability is typically examined with regard to the ease with which performers can image visually (e.g., in the mind's eye "see" movement) and kinesthetically (e.g., "feel" a movement in their muscles as they image it). One study suggested that dancers have greater visual than kinesthetic

imagery ability.⁴ However, Golomer and colleagues⁵⁸ found that half of the dancers participating in their study had higher kinesthetic imagery ability while the other half had a mixed (visual and kinesthetic) ability. Another study found that dancers have a higher kinesthetic imagery ability than athletes,⁷⁶ although these findings were not duplicated in a later study which found the two groups to have comparable kinesthetic and visual imagery abilities.⁷⁷ Bolles and Chatfield⁸ found that the majority of dancers labeled as "high imagers" (those with high scores on a measure of imagery ability) had a learning style with a preference for "feeling," i.e., learning through a concrete experience.⁸ The researchers inferred that imagery may be a way of generating a concrete experience for the dancer when one is not readily available in reality.⁸ Taken together, the mixed findings yielded to date make it difficult to draw conclusions as regards dancers' imagery abilities, and more research is needed. However, perhaps more important than which modes prevail in the field are questions relating to the functional significance imagery ability has for dancers. For instance, do those with low imagery ability also struggle to learn and rehearse steps and phrases? Can dancers with better imagery ability benefit more from an imagery intervention focused on enhancing self-confidence?

Taking a slightly different approach, Overby⁴⁵ examined the cognitive imagery, movement imagery, spatial imagery, and body image of novice and experienced dancers. It was found that experienced dancers differed significantly from novice dancers in their cognitive, spatial, and body imagery.⁴⁵ It appears that veteran dancers have higher imagery abilities in comparison to beginners, presumably due to their years of study. There was, however, no significant difference found between the two groups in movement imagery, which may be due to the questionnaire used. Recent developments in sport science, such as the Sport Imagery Ability Questionnaire (SIAQ)⁷⁸ and the updated

Movement Imagery Questionnaire-3 (MIQ-3),⁷⁹ represent improvements to the way imagery ability can be captured. While these tools can offer insight into some characteristics of dance imagery, they do not capture all of its aspects, such as role and movement images; dance specific tools should be developed to fully understand this dance imagery ability. Further discussion of this topic can be found in the Limitations section.

Imagery ability may not be a static quality. Studies have shown that it can be increased through a myriad of interventions.⁸⁰⁻⁸² Research findings have indicated that dancers believe the ability to use imagery can be improved^{3,41,42}; moreover, imagery complexity, structure, and controllability have been reported to increase as dancers progress.^{41,42} However, the "how" behind these changes has yet to be fully understood by the dance community.

Limitations within the Field

A number of practices influence the field of dance imagery and should, therefore, be explained. First, personal experience is often the basis for later investigations and recommendations. A key example is the work of Dr. Lulu Sweigard. Sweigard spent many years creating and refining ideokinesiology, using herself as her main research tool. The resulting images have been used in experimental and analytical studies, such as those of Hanrahan and Salmela²² and Batson.⁶⁹ Although Dr. Sweigard conducted research studies involving some underlying principles of ideokinesiology, not all of the principles or images themselves have been scientifically examined. Images taken from the Franklin Method and used in imagery interventions fall into this same category. There is little cohesion between the images used in these interventions, and though movement changes may have been recorded, it is impossible to know what aspects of the images caused the results, severely limiting the applications to dance performance. It should be noted, too, that many dance studies have followed the ideokinetic

principle of integrating imagery with relaxation. This is not only in conflict with feedback from dancers^{10,28,54} but also recent research in sport, including the PETTLEP model, suggesting that relaxation as part of imagery use may be contraindicated.^{64,66} Personal experience is, and should be, a key driver of research; moreover, the work of imagery practitioners should by no means be disregarded. Nonetheless, it is important to distinguish between recommendations derived from personal experience and research.

Second, there is a distinct lack of tools for gathering information in this field. Many questionnaires have been borrowed from sport research but must be adapted to be relevant to dance. Of the 43 studies reviewed, 22 used questionnaires, 15 of which were developed for sport or general psychology. The modifications necessary to adapt these questionnaires to dance may have impacted their reliability and validity. For instance, the Sport Imagery Questionnaire (SIQ)⁵² assesses the extent to which athletes utilize imagery in their practice. In dance research, the wording is changed, altering the reliability of the SIQ. In the Fish and coworkers⁹ study, three items had to be dropped during statistical analysis, possibly due to the altered language. Because of this, the findings from this study regarding dancers' imagery use should be interpreted with caution. Monsma and Overby⁴⁷ and Nordin and Cumming¹³ encountered similar issues with the SIQ. The problems created by deploying the SIQ to assess imagery use in dance may have been alleviated by the introduction of the DIQ.⁴ As a dance-based questionnaire, the DIQ measures similar constructs to the SIQ but also includes examples of metaphorical imagery. The DIQ is a relatively new dance research tool and has not been used in many studies. Consequently, its validity is still being established, and future studies are necessary to understand fully its potential value in generating useful findings.

Another effect of the lack of dance-based research tools is the creation and

use of study-specific questionnaires and evaluation measures. Again, of the 43 studies reviewed, 8 devised their own questionnaires to assess anything from dancers' opinions on images to dancers' imaging histories. Although the methodologies and research referenced when constructing these questionnaires were mostly sound, and valuable data were gained, the internal consistency and reliability of the questionnaires remain unknown since comparative studies are unavailable. As a result, the reader should absorb these findings with caution. Similarly, of the studies reviewed that examined the effects of imagery on movement, nine developed evaluation measures to assess changes in movement amplitude or quality. While the measures are similar, the fact that each is slightly different makes comparisons difficult.

The use of personal journals in Gamboian and colleagues' study²⁰ raises another point of discussion, namely that imaging appears to be a very individual experience. It has been found that dancers adjust images to their needs and feelings, altering the original versions given either by teachers or researchers.²⁸ In fact, tailoring an image to the individual is recommended both in sport and dance.^{25,57,71,75} Accordingly, the way in which a dancer images, her imagery ability and her feelings toward the images will all affect the outcome. As is recommended in sport, manipulation checks should be incorporated into study methodologies to account for these variations.⁶⁶ Unfortunately, few of the imagery intervention studies reviewed included any data of this type, and if it was logged, it was done so after a significant amount of time had elapsed. If no data are recorded covering the participant's personal views on imagery, her imagery ability, the images, and how those images were used, then it will be difficult to interpret subsequent findings. It is important, too, that these data be gathered as close to the imaging event as possible so as to limit memory decay.

Finally, another issue facing dance imagery research is low rates of dancer participation. With some excep-

tions,^{3,4,13,41-43,50} this concern is common in the field; for whatever reason, it seems challenging to find large numbers of dancers willing to partake in studies. Many researchers look to small university departments or schools with low enrollment, making it difficult to generalize findings to larger populations.^{8,10,19,20,22,23,27,28,56,59,60} It also poses a problem for establishing control groups; when few dancers are involved, setting aside a group that receives no intervention becomes difficult. However, without a sufficient control group, documenting changes that result from an intervention is challenging.

Future Directions in Research

Before a discussion on the future of dance imagery research can take place, a point must be made concerning the relationship between dance and sport science. To date, much research in dance imagery has occurred without thorough consideration of corresponding sport research. As mentioned previously, the PETTLEP model is of particular note.⁷¹ Its recommendations represent the most reliable in the published literature to date and should, therefore, be used in conjunction with dance guidelines to inform both how to image and image creation for research. Through the PETTLEP model, dance science could not only be linked to sport, but it could also draw from updated information in neuroscience and psychology, two disciplines that are not often referenced. This relationship should extend both ways: dance science has investigated phenomena that may be of interest to sport, such as metaphorical imagery and imagery during overt movement. This review is only scratching the surface in terms of options in an exchange that could be rewarding for both dance and sport.

Future explorations into dance imagery will need dance-specific information gathering tools, as borrowing and accommodating sport measurements has proven problematic in some studies. Therefore, it would be useful if researchers developed and evaluated measurement tools covering

imagery ability, including not only visual and movement imagery ability but also imagery controllability and metaphorical imagery ability. Some questionnaires developed for sport, such as the MIQ-3⁷⁹ and the SIAQ,⁷⁸ could be used as templates to develop dance-specific tools. However, psychometric testing and large participant samples will be needed to ensure that these new questionnaires are reliable. Once developed, dance-specific measurements, such as the DIQ,⁴ can be used not only in descriptive studies but also as a means to describe participants and explain outcomes in experimental research. One area that may prove useful to dancers is mental rehearsal. The intervention could consist of systematic, daily imagery of what one has done in class in order to look at how that relates to the goal of improving performance. Alongside manipulation checks, the DIQ could be incorporated to show whether the participating dancers employed imagery throughout the study and if so how often and of what types. In this way the researchers will understand more about the dancers' imaging habits and be better able to interpret findings.

The work of Fish and associates,⁹ Monsma and Overby,⁴⁷ and Nordin-Bates and coworkers⁵⁰ has raised some interesting points regarding the link between self-confidence and imagery. Findings indicate a positive link between mastery imagery and dancer self-confidence.^{9,47} Future research should follow this thread, designing interventions aimed at increasing self-confidence, as dancers often report problems with this particular psychological construct.^{9,47,50} In a similar vein, dance scientists may wish to follow the lead of sport and investigate cognitive-behavioral strategies involving imagery as a means to manage performance anxiety.⁸³

Finally, and perhaps this is the biggest challenge, a branch of research should focus on imagery use during movement. Dance experts have long taught imaging during movement as a means to enhance performance.²² Researchers have validated this strat-

egy by finding that dancers believe it to be useful.^{10,19,20,22,28} If dance science could better explain the "How" and the "Why" of this mechanism, teachers and dancers would be better able to apply imagery to achieving their goals, whether they be stronger technique, increased self-confidence, or more powerful performance. Future research should approach this from a systematic standpoint: imagery intervention studies should be created based on previous studies, such as Hanrahan and colleagues¹⁰ or Heiland and associates,²³ but with a strong foundation in imagery creation recommendations from both dance^{1,25,27} and sport.^{71,75} Additional data concerning imagery ability and dancer alteration of images should be gathered in these studies so that we may gain a better understanding of whether all dancers can benefit from an intervention, or variables such as imagery ability moderate their effectiveness. Perhaps an intervention could take place over a period of time, e.g., a school term, following two classes, one with and the other without systematic imagery practice. Measurements of their skill improvement could then be compared. Would the imaging dancers improve their dance technique faster? Would they feel more confident? The future study of dance imagery must be solidly based in the wide-ranging existing literature so that the field may move forward most efficiently and thereby produce applicable knowledge for the dance community.

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