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A QUALITATIVE INVESTIGATION OF YOUNG FEMALE DANCERS' USE OF  
IMAGERY

by

Irene L. Muir

A Thesis  
Submitted to the Faculty of Graduate Studies  
through the Faculty of Human Kinetics  
in Partial Fulfillment of the Requirements for  
the Degree of Master of Human Kinetics at the  
University of Windsor

Windsor, Ontario, Canada

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25 May 2017

## DECLARATION OF ORIGINALITY

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## ABSTRACT

Although dancers have noted using imagery to mentally rehearse a routine, understand and reinforce movement, inspire strong emotions and lower arousal levels (Pavlik & Nordin-Bates, 2016), this finding is specific to adult dancers, overlooking imagery use with young dancers. The present study qualitatively examined the 4 W's of imagery use (Where, When, What and Why young dancers are imaging) with young female dancers 7-14 years of age. Furthermore, age differences between the four cohorts (7-8, 9-10, 11-12, 13-14) were also examined. Twenty-three female dancers ( $M_{age} = 10.43$ ,  $SD = 2.19$ ) from various dance styles participated in one of four focus groups discussions. Thematic analysis revealed findings similar to those identified in both the adult dance and children's sport domains. There were findings, however, emerging from the current study specific to young female dancers. These findings, in addition to practical implications for both dance instructors and physical education teachers are provided.

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## RESEARCH ARTICLE

### **Introduction**

Mental skills have been widely used in the motor domain as strategies to initiate and sustain performance (Krane & Williams, 2006). In dance specifically, mental skills have been employed as a means to control arousal and concentration and to improve self-confidence and self-talk (Fish, Hall, & Cumming, 2004; Hanrahan, 1996; Monsma & Overby, 2004). One mental skill capable of influencing cognitive, behavioral, and affective outcomes in dancers is imagery. Imagery, which is described as the creation or recreation of an experience in one's mind (Vealey & Greenleaf, 2010), has been used by dancers to mentally rehearse a routine, understand and reinforce movement, inspire strong emotions, and lower arousal levels (Pavlik & Nordin-Bates, 2016).

Most of the imagery research in the motor domain has been conducted in sport and has been grounded in Paivio's (1985) and later Hall, Mack, Paivio and Hausenblas' (1998) analytic framework. According to the framework, imagery can serve both cognitive and motivational functions, operating at a general or specific level. As such, five imagery types exist: cognitive specific (CS; imaging specific skills and techniques); cognitive general (CG; imaging strategies, game plans and routines); motivational specific (MS; imaging achieving one's goals); motivational general-mastery (MG-M; imaging being in control, confident and mentally tough); motivational general-arousal (MG-A; imaging one's arousal and emotion). These five imagery types result in various outcomes which have been shown to positively contribute to athletic performance (Hall, 2001).

Despite the plethora of research on imagery use in sport, Overby and Dunn (2011) noted the way in which imagery was operationalized for athletes did not fully represent

imagery in dance. Although both athletes and dancers train their bodies to full potential and aim for high technical standards (Hays, 2002), the way in which dancers and athletes perceive the word “imagery” is rather different. For athletes, imagery is portrayed as a mental tool to rehearse skills, situations and feelings (Murphy & Martin, 2002), whereas dancers incorporate external objects not actually present in order to improve a movement (Overby, 1990), therefore using imagery in a more indirect/metaphorical manner. Due to such differences, Overby and Dunn (2011) proposed an imagery definition specific to the dance setting:

Dance imagery is the deliberate use of the senses to rehearse or envision a particular outcome mentally, in the absence of, or in combination with, overt physical movement. The images may be constructed of real, or metaphorical movements, objects, events or processes. (p. 9)

Similar to the sport domain, imagery serves many benefits in the dance domain (e.g., to set goals, improve self-confidence, prepare for performance) and can be gained through proper imagery training (Calmels, D’Arripe-Longueville, Fournier, & Soulard, 2003). Given the complexity and holistic nature of dance images, a call was made for more qualitative studies in this area (Hanrahan & Vergeer, 2000). Responding to this call, Nordin and Cumming (2005) examined where, when, what and why adult dancers imaged. Using the 4 W’s framework devised by Munroe, Giacobbi, Hall, and Weinberg (2000), Nordin and Cumming (2005) found *where* dancers reported imaging most was at home and in dance settings (e.g., changing room, the studio, in the wings before going on stage). For *when*, dancers reported imaging at various times (e.g., specific movement, practice, performance, teaching, particular dance types), however the content of the

image varied. For example, dancers reported imaging the execution of a movement just prior to performance, whereas they reported using metaphorical images during actual movements (Nordin & Cumming, 2005).

In this study, Nordin and Cumming (2005) indicated six imagery types represented *what* dancers image. Execution imagery involves imaging skills, planning and strategies, and scenarios. Metaphorical imagery includes images of colour, objects that are not present, actions that cannot actually be performed, the environment, and themes. Content images include people and places, whereas body-related images involve feeling, appearance, healing and injury, and anatomy. Character/role imagery, a type of imagery unique to the dance setting, involves images of character and roles in terms of appearance, behaviours and emotions. Irrelevant images include images irrelevant to the dance context which can be implemented purposefully due to boredom. Nordin and Cumming (2005) also found several reasons as to *why* dancers engage in imagery. Similar to the sport research (Hall, 2001), cognitive reasons involve learning and improving, memorizing and planning, whereas motivational reasons include motivational drive, and changing thoughts and feelings. Unique to dance, however, participants use imagery for artistic reasons (choreographing and inspiration, enhancing movement quality, communicating with audience).

From the qualitative findings of Nordin and Cumming's (2005) study, a dance specific measure was developed to assess the frequency of dancers' imagery use (Dance imagery Questionnaire; DIQ, Nordin & Cumming, 2006a). Prior to its development, early dance imagery researchers used the Sport Imagery Questionnaire (SIQ; Hall et al., 1998). Despite the SIQ being the most widely used measure in sport imagery research (Morris,

Spittle, & Watt, 2005), it was found to be problematic with dancers. With slight adjustments to wording of the SIQ, both Fish et al. (2004) and Monsma and Overby (2004) investigated imagery use with ballet dancers. Ballet dancers reported using all five imagery types, similar to athletes. However, problems with the internal reliability of the CG and MG-A subscales were noted, thus questioning the applicability of the SIQ to the dance setting.

To adequately measure the frequency of all imagery types used by dancers, the DIQ (Nordin & Cumming, 2006a) was developed. Overall, dancers were found to engage in four imagery types: technique, goals, role and movement quality, and mastery. Technique imagery involves the mental rehearsal of movements or sequences. For example, a dancer may image an arabesque being performed perfectly. Goal imagery encompasses striving to achieve a dance-related goal. Role and movement quality imagery involves character and roles as well as metaphorical/indirect images containing objects that are not actually present in order to improve a specific movement (Overby, 1990). For example, a dancer may image themselves as a swan in order to perform in a calm and graceful manner. Lastly, mastery imagery is related to controlling anxiety, planning, and remaining focused. For instance, a dancer may imagine themselves being calm prior to a performance.

Researchers found technique imagery is used most often by dancers, while mastery imagery is used the least (Nordin & Cumming, 2006a). Such findings are contradictory to those noted in the sport domain, which have consistently found athletes to engage most in mastery-type imagery compared to other sport imagery types (Abma, Fry, Li, & Relyea, 2002; Gregg, Nederhof, & Hall., 2005; Hall et al., 1998). Mastery

imagery (MG-M) in sport is similar to that of dance as it consists of imaging oneself being confident, mentally tough and in control (Hall et al., 1998). Given the dance domain requires the use of mastery imagery similar to that of sport, the underutilization of this imagery type by dancers is of concern (Pavlik & Nordin-Bates, 2016). Despite the potential concern, dance imagery researchers have examined the effect of mastery imagery with dancers (Fish et al., 2004). Monsma and Overby (2004) examined audition anxiety and imagery use among auditioning ballet dancers and found dancers who were confident in their ability to perform were better able to use kinesthetic imagery, used more mastery imagery and less images associated with arousal when compared to less confident dancers. Given most of the dance imagery research has been conducted with ballet dancers (e.g., Fish et al., 2004; Heiland & Rovetti, 2013; Monsma & Overby, 2004; Nordin-Bates, Cumming, Aways, & Sharp, 2011), it is plausible that other dance styles may use imagery differently. Although only one study has compared imagery use among ballet and contemporary dancers (Nordin-Bates et al., 2011), findings from the sport domain (Munroe, Hall, Simms, & Weinberg, 1998) report the use of cognitive and motivational imagery types to be influenced by sport type. Future research in this area is warranted for dancers.

The popularity of dance is not specific to just the studio. Dance has also been reported as a popular activity for young girls (grades 3-6) in physical education classes. Furthermore, dance has been shown to be an important aspect of physical education as it allows children to gain a sense of rhythm, space and time (Zrnzevic, Lakušić, & Zrnzević, 2015). Therefore, it is especially important to examine strategies that can impact girls' involvement in dance as girls' participation in physical activity and sport is

lower compared to boys (CDC, 2011). Imagery may be one such strategy as it can enhance children's memory for movement and can be utilized by children as young as three years of age (Overby, 1990).

Although imagery is believed to be a fundamental aspect of dance training (Adair, 1992), adult dancers have been the sample examined, overlooking young dancers' use of imagery. To date, no empirical study has specifically investigated young dancers' use of imagery. Drawing on the findings from the sport domain, young athletes report using all five imagery types similar to their adult counterparts (Munroe-Chandler & Hall, 2005), however such imagery types vary by age and gender, suggesting that children may use different or additional imagery types compared to that of adults. In line with Nordin and Cumming's (2005) qualitative study with dancers 22-42 years of age, a qualitative study examining young female dancers' imagery use (what, where, when, why) from various styles is warranted. The purpose of the current study was to qualitatively investigate the 4 W's of imagery use (Where, When, What and Why) with young female dancers 7-14 years of age. This age range was chosen as it is suggested children seven years of age are able to start forming kinesthetic and transformational images (Piaget & Inhelder, 1971) and begin to image similar to adults by the age of 14. In addition, this age range is also consistent with other imagery focus group studies conducted with young athletes (Munroe-Chandler, Hall, Fishburne, O, & Hall, 2007; Munroe-Chandler, Hall, Fishburne, & Strachan, 2007). Dancers were placed into one of four age cohorts (7-8, 9-10, 11-12, and 13-14) based on the suggestion of using narrow and distinct age groups when working with children (Thomas, Gallagher, & Thomas, 2001). In addition to uncovering

where, when, why and what young female dancers are imaging, differences between imagery use of the various age cohorts can be examined.

## **Method**

### **Theoretical Approach**

Given the primary researcher's epistemological viewpoint such that a phenomenon is understood through individuals' perceptions (Neuman, 2000), inquiry was guided by an interpretive phenomenological approach. Phenomenology is a method of inquiry used to investigate individuals lived experiences of a phenomenon (Grbich, 2012). Specifically, interpretive phenomenology can provide information about a phenomenon that is poorly understood through the context of individuals experiencing such phenomenon (Pascal, 2010). Heidegger (1962) argued that all descriptions are interpretations as understanding is an inevitable component to our being in the world. In line with the goals of interpretive phenomenology, the use of imagery by young dancers was identified by both the researcher's understanding of imagery use in dance as well as the insight provided by the participants, ultimately providing a deeper understanding of the phenomenon (McConnell-Henry, Chapman, & Francis, 2009). When using an interpretive phenomenological approach to inquiry, the researcher's previous knowledge of a phenomenon serves as valuable guides in the research findings, producing research that is more meaningful (Humble & Cross, 2010). Therefore, a reflexive journal was maintained in order to expose biases in the researcher's approach to constructing knowledge and also while developing the methods and interpreting the findings of the current study (Finlay & Gough, 2003; Sparkes & Smith, 2014).

### **Participants**

Participants included 23 female dancers between 7-14 years of age ( $M_{age} = 10.43$ ,  $SD = 2.19$ ) from four different studios in Southwestern, Ontario. Dancers participated in various dance styles including ballet, tap, jazz, hip-hop, contemporary, lyrical, acro, and highland. Twenty-one dancers participated in more than one dance style at the time of recruitment. Dance experience ranged from 2-12 years ( $M = 7.82$ ,  $SD = 2.77$ ). Purposeful sampling (Patton, 2015) was used to recruit participants as the criteria included: 1) Participants had to be female dancers between 7-14 years of age and 2) had to be dancing in their respective style for at least two years.

### **Design**

A total of four focus groups were conducted with 5-7 participants in each of the four cohorts (7-8, 9-10, 11-12, 13-14) based on the recommendations of Krueger and Casey (2009) who suggest small age spans. Focus groups are defined as “a discussion involving a small group of participants, led by a moderator that seeks to gain insight into the participants’ experiences, attitudes, or perceptions” (Hennessy & Heary, 2005, p. 236). An interview guide approach (Patton, 2002) was used with a focus on the 4 W’s of imagery use (Appendix A). The interview guide consisted of questions pertaining to *where*, *when*, *what* and *why* young female dancers are imaging. For example, to examine the *where* component of the 4 W’s, a probe included “Where do you use imagery the most?” Given the age of the sample, the focus groups lasted between 45-60 minutes based on the suggestions by Krueger and Casey.

### **Procedure**

After obtaining clearance from the research ethics board, approval was sought from the studio owners to conduct a focus group with their dancers. Parents were then

approached before or after dance class and were informed about the purpose of the study and its focus group design. Those who agreed to their daughter participating were asked to sign a Parent/Guardian Consent to Participate in Research form (Appendix B). Once parental approval was granted, participants were asked to sign an Assent Form (Appendix C). A date and time to conduct the focus group was then determined. Each focus group consisted of the participants in their age cohort, a moderator (Ms. Muir), and a technical assistant (undergraduate research assistant). The technical assistant was responsible for recording and taking notes for each focus group interview.

Each focus group interview was separated into three sections (Patton, 2002). The first section included an introduction with information regarding what was to be expected during the interview and the role of both the moderator and technical assistant. Given the age of participants, a modified version of Overby and Dunn's (2011) dance imagery definition was presented:

*Dance imagery is a skill that is done in our head using our five senses (sight, taste, sound, smell, and touch) to picture a movement or several movements in dance. We can use imagery on its own or while we are dancing. The images you form in your head can be made up of real movements or, movements and objects that do not actually exist.*

Once provided with a definition, dancers were encouraged to discuss their past experiences in their respective dance style. The second section, which is derived from Munroe et al.'s (2000) 4 W's framework, focused on dancers' use of imagery. More specifically, dancers were asked to discuss *where*, *when*, *what* and *why* they use imagery in dance. Probes were used to gain a more in-depth understanding of imagery use with

young female dancers. During the final section, the moderator presented key points from the session and provided an opportunity for the addition of any comments to be made. All focus groups were transcribed verbatim by the moderator.

### **Data Analyses**

A thematic analysis was performed as it allowed similarities and differences to be presented and summarized key components within the data set (Braun & Clark, 2006). The interpretation of social and psychological concepts within the data is also a strength of this analysis (Braun & Clark, 2006). Based on Braun and Clark's (2006) recommendations, six phases were implemented during the thematic analysis: 1) immersion; 2) generating initial codes; 3) identifying themes; 4) review and refining themes; 5) defining and naming themes; and 6) finalizing the thematic structure. The primary investigator became familiar with the data set by reading the interview transcripts and listening to the recorded interviews. The transcripts resulted in 50 single spaced pages of text. For further analysis, data were then entered into the QSR NVivo 11 software package (QSR International, 2015). NVivo is the most widely used software package for managing, organizing and facilitating analysis with qualitative data (Hoover & Koerber, 2011). Initial codes (short, simple and precise key words to represent one idea or concept; Saldaña, 2011) were identified using an open coding process (Charmaz, 2003). Themes were then created using inductive and deductive approaches. An inductive approach allowed findings to emerge that would not have developed using a deductive approach (Braun & Clarke, 2006). When conducting qualitative research, it is suggested that a combination of deductive and inductive techniques are most accurate, as almost all studies are designed based on previous theory and research (Patton, 2002; Vazou,

Ntoumanis, & Duda, 2005). Once themes were created, they were ordered into hierarchical structures, also known as categories (Braun & Clarke, 2006). Once categories and subcategories were named, comparisons were made between each cohort and a final report was developed outlining young female dancers' imagery use.

### **Trustworthiness**

To ensure the trustworthiness of the data, 20% of the transcriptions coded by the primary investigator were also coded by an expert in the field and were compared to determine a percentage agreement. As a result, 93% agreement was found between both researchers. According to MacQueen, McLellan-Lemal, Bartholow, and Milstein (2008), a percentage agreement above 85% is classified as "good" agreement between the two researchers. Therefore, the coding process was deemed trustworthy. If there were disagreements with respect to the categorization of specific text units, each researcher provided a rationale for their decision and was discussed until a consensus was reached.

Furthermore, the moderator conducted debriefing sessions after each focus group interview to confirm the accuracy of the content presented during the discussion. In addition, a summary of the group's commentary was provided at the final stage of each focus group. Participants were asked if the content provided in the summary adequately signified what was discussed throughout the session and were also provided with the opportunity for any additional comments or clarifications to be made.

### **Results**

Figures 1-5 illustrate the major themes, categories (sub-themes), and sub-categories that emerged from the analysis specific to *where*, *when*, *what* and *why* young female dancers image. In addition, *how* dancers image is also presented as this theme

inductively emerged from the analysis. In subsequent paragraphs, each of these major themes will be described in detail. As well, the frequency counts will be provided to illustrate the number of dancers who responded to a particular imagery category or subcategory. Finally, imagery use will be compared between age cohorts (7-8, 9-10, 11-12, and 13-14). This latter information is identified within the text as well as illustrated in each figure such that the dotted lines indicate age differences within the category or subcategory (i.e., one or more age cohorts did not use imagery for that particular category or sub-category).

### **Where**

*Where* (Figure 1) refers to the location in which dancers image and consists of three categories: a) *in dance settings*, b) *at home* and c) *at school*. Dancers indicated using imagery in dance settings such as the studio ( $n=4$ ), competitions ( $n=7$ ), recitals ( $n=3$ ), conventions ( $n=4$ ), backstage ( $n=3$ ), and in the changing room ( $n=1$ ). Dancers from all age cohorts indicated using imagery in the studio and at competitions. Only the middle aged cohorts (ages 9-10 and 11-12) cited using imagery at recitals and only the youngest (ages 7-8 years) and oldest (ages 13-14 years) age cohorts reported using imagery backstage. Dancers 13-14 years of age mentioned using imagery at conventions and dancers 7-8 years of age indicated using imagery in the changing room. Dancers also reported using imagery in more than one setting. For instance, Dancer 13 explained: “I do it [imagery] backstage or in the changing room, it just helps me clear my mind so I can just think of my dances.”

In regard to using dance imagery at home ( $n = 5$ ), only the older age cohorts (ages 11-12 years and 13-14 years) reported using imagery in this setting. Dancer 9 provided

the following quotation: “Sometimes when the radio is on in my kitchen, I would listen to the music that I really like and I just dance all over the place and imagine myself being on stage while I’m dancing.” Further, dancers from all age cohorts, except for the 9-10-year-olds, reported using imagery in the school setting (e.g., review a routine while sitting at their desk,  $n = 5$ ).

### **When**

*When* (Figure 2) refers to the timing of dancers’ imagery and is further separated into 8 categories: a) *prior to going on stage* ( $n = 17$ ), b) *while on stage* ( $n = 10$ ), c) *during practice* ( $n = 8$ ), d) *after competing/performing* ( $n = 6$ ), e) *after making mistakes/experiencing difficulties* ( $n = 15$ ), f) *days prior to a competition/performance* ( $n = 7$ ), g) *before going to bed* ( $n = 3$ ), and h) *during free time* ( $n = 2$ ). Dancers from all age cohorts indicated forming images just prior to going on stage to prepare and reduce anxiety. Dancer 16 described a situation in which she used imagery prior to going on stage: “Before I was about to compete for the first time, I was really nervous so I imagined what it would be like on stage and just thinking about all the movements and lengthening and that seemed to help me.” Given anxiety is common prior to performing (Hamilton, 1998); some images provided by dancers were negative in nature and consisted of falling off the stage or making a mistake. Dancer 17 stated: “When I’m about to go on stage and I’m scared I’m going to fall, I imagine myself falling and then I get even more nervous.” Several dancers acknowledged that such negative images had the potential to hinder their performance.

All age cohorts cited using imagery while actually dancing on stage. Dancer 8 provided the following explanation for why she prefers to use imagery on stage as

opposed to during practice:

In the studio, it's hard for me to use it [imagery], I feel like I use it more on stage when I actually have someone to perform to. It's hard to use it with myself in the mirror, so I do it more when I actually have an audience.

All age cohorts indicated using imagery during practice, particularly when they felt a style was challenging (e.g., ballet). Using imagery during each practice was noted as a potential benefit as it allowed for performance to gradually improve. Dancers from all age cohorts described using imagery after making a mistake or when experiencing difficulties with a movement or step. Other difficulties were related to emotion (e.g., nervous, frustrated, or upset) and when feeling fatigued.

Except for the 7-8-year-old group, all age cohorts indicated using imagery in the days prior to a competition/performance to review a routine or to imagine performing well at the upcoming competition. In regard to after competition, all age cohorts described using imagery to critique one's performance or to fix mistakes. Dancer 2 describes using imagery to critique her performance following a competition: "After [dancing], you just go through that dance that you did on stage and you say in your head, did I do that step good or not?" Only dancers in the oldest age group (13-14 years) cited using imagery before going to bed, whereas only the 11-12-year old and 13-14-year old age groups used imagery during their free time (e.g., "Any free time I have I make up dances and imagine I'm performing; Dancer 11).

## **What**

*What* dancers image is further separated into *imagery types* (Figure 3a) and *imagery characteristics* (Figure 3b). It is important to note that imagery types refer to

what is being imaged, whereas imagery functions (or the *Why*) refer to the reasons for using imagery (Murphy, Nordin, & Cumming, 2008). In addition, one imagery type can be used to achieve multiple outcomes or vice-versa (Evans, Jones, & Mullen, 2004; Nordin & Cumming, 2008). For example, a dancer may imagine performing a turn perfectly on stage in order to improve performance and to increase self-confidence.

### ***Imagery Types***

Dancers engaged in six types of imagery: a) *technique imagery*, b) *metaphorical imagery*, c) *feedback imagery*, d) *goal imagery*, e) *environmental imagery*, and f) *character/role imagery*.

**Technique imagery.** Technique imagery included images of a) *routines* ( $n = 13$ ), b) *certain steps* ( $n = 6$ ), c) *specific movements* ( $n = 4$ ), e) *music* ( $n = 3$ ), f) *dance styles* ( $n = 2$ ), and g) *marking* ( $n = 1$ ). Dancers from all age cohorts imagined a full routine prior to performing on stage as well as certain steps with which they were having trouble. Only the older age cohorts (11-12 years and 13-14 years) imaged the technique of specific movements which included a pique turn (e.g., “I imagine me doing a turn that I’m not really good at, and I imagine doing it good”; Dancer 14), a grand battement (e.g., “I imagine my legs going higher”; Dancer 16), or a tendu (e.g., “I imagine my feet more pointed”; Dancer 16).

Only the three older groups (ages 9-14 years) incorporated music into their images which was often accompanied by movements performed to that particular song. Dancer 9 provided an example:

When I think about the music I’m going to dance too, I think about the tempo of that and then when I’m doing the dance in my head and I’m thinking about what

step is next I will remember it by tempo and picture it by tempo.

Lastly, only the 7-8-year old and 11-12-year old age groups indicated imaging a particular dance style (e.g., ballet and hip-hop) and only the youngest age group (7-8 years) imagined marking a routine (e.g., “Sometimes in my head I imagine me just marking it and then I can get the move perfectly and I’ll go really full out when I actually do the step”; Dancer 21).

**Metaphorical imagery.** Dancers indicated using metaphorical images involving objects not actually present ( $n = 14$ ) and actions that cannot actually be performed ( $n = 4$ ). All age cohorts indicated imagining objects not actually present. For example: “When we do kick grand battement, we have to imagine that there are fresh eggs on the ground and we don’t want to crack them”; Dancer 8. Another example was provided by Dancer 13: “Sometimes we need to have straight legs in ballet so we imagine a ruler on the back of our leg so we imagine not bending it or not being able to.” Dancers from all age cohorts mentioned imaging actions that cannot actually be performed. Dancer 16 noted: “When you’re working on technique, you think about your arms lengthening out as far as you can while touching the sides of the room or your head pulling up as tall as you can.”

Dancers 11-12 years of age noted creating metaphorical images of being an animal (e.g., fox, pig, cat, and butterfly) or fictional character (e.g., giant, toy soldier, teddy bear, rag doll) for a movement to appear a certain way. For example, a dancer may imagine themselves prancing like a cat to perform a pas de chat movement in a quick and quiet manner. Dancers in this age cohort also mentioned imaging metaphorical scenarios (e.g., climbing up a beanstalk) or metaphorical environments (e.g., field full of butterflies). Several of the metaphorical images mentioned by dancers were obtained

from their teachers as such images were incorporated during classes. Overall, dancers described metaphorical images as being more effective than technique images as they provide a better indication of what a movement entails.

**Feedback imagery.** Four subcategories emerged within this category such as images of a) *corrections* ( $n = 6$ ), b) *self-talk* ( $n = 5$ ), c) *mentoring* ( $n = 3$ ), and d) *movement modeling* ( $n = 7$ ). Images of corrections were mentioned by the three oldest age groups (9-14 years) and involved corrections given by teachers (e.g., “I would keep imagining the corrections my teacher gave me and I would just keep remembering it until next time, and then I’ll do it right”; Dancer 6) and critiquing one’s performance (e.g., “I imagine what I’m doing and see what corrections I need to make”; Dancer 7). Only the middle age groups (9-10-years and 11-12-years) reported images of self-talk (e.g., “If the music skips and you’re doing the wrong move you can use imagery to say okay this is the music, what steps am I supposed to be doing?”; Dancer 3).

Two age cohorts (7-8 years and 11-12 years) provided feedback images including encouragement or guidance given by parents, illustrated in the following quote: “I imagine my mom saying that I did a good job and just to be positive that I will get the highest level that I can”; Dancer 21. In regard to movement modeling, dancers described images of modeling the technique of other dancers (e.g., “I’ll imagine how some of the dancers inspire me and how they would have done it”; Dancer 16) or themselves performing at a high technical standard (e.g. “I use imagery to think that I’m a professional dancer so that makes me dance better”; Dancer 8). These images were reported by both the 7-8-year and the 11-12-year old age cohorts.

**Goal imagery.** Goal imagery included outcome goals ( $n = 8$ ), process goals ( $n =$

3), and performance goals ( $n = 6$ ). Dancers from all age cohorts referenced images of outcome goals which consisted of winning a medal, receiving a high mark at a competition, performing one's best, and receiving dance scholarships in the future. Only the middle cohorts (9-12 years) mentioned process goals which involved images of what was required to achieve a goal and is demonstrated in the following comment provided by Dancer 2: "I just imagine myself that I will go home and practice it a bunch of times if I kept on getting that step wrong and I would just keep on trying my hardest." Finally, all cohorts referenced performance goals and included images of perfecting a desired movement (e.g., "I imagine myself coming to dance class and achieving 3 turns today"; Dancer 2) or reaching high technical standards (e.g., "I'll imagine someone else doing it [move] and I'll work towards that"; Dancer 13).

**Environmental imagery.** Within the category of environmental imagery, three subcategories emerged: a) *people* ( $n = 5$ ), b) *places* ( $n = 4$ ), and c) *spacing* ( $n = 2$ ). For people, only the 9-10-year olds mentioned images of other dancers (e.g., "During my private lessons, I imagine other people doing dances"; Dancer 4) whereas dancers 11-12 years of age reported images of the audience (e.g., "I imagine thousands of people [in the audience] and I think I can do better"; Dancer 8). It is important to note that the images of "other dancers" differ from those mentioned in the "movement modeling" subcategory of feedback imagery, as those images consisted of the technique of other dancers, whereas the images formed in the present subcategory involved the presence of other dancers on stage. Dancers in the 7-8- year old and 11-12-year old age groups indicated imagining the audience not being present to calm their nerves. Dancers from all age cohorts, except the 7-8-year olds, cited images of places (e.g., studio) to feel comfortable while performing

on stage. Lastly, dancer's 9-10-years indicated using images for spacing during certain points of a routine (e.g., "Sometimes I imagine where am I, where do I have to go, am I in the right spot"; Dancer 2).

**Character/role imagery.** Three sub-categories of character/role imagery emerged: a) *appearance* ( $n = 9$ ), b) *emotions* ( $n = 5$ ), and c) *stories* ( $n = 1$ ). With respect to appearance, all age cohorts, except the 13-14-year olds, cited images of the behaviors of a character/role (e.g., "I imagine how the character would perform"; Dancer 11). The youngest (ages 7-8 years) and the oldest (ages 13-14 years) cohorts reported images of the qualities of a particular dance style. Dancer 23 provided the following: "In hip-hop, I imagine that I have a lot of energy, in ballet I'm super smooth and not going superfast. In jazz, I imagine that I'm sharp and sassy"; Dancer 23. Appearance images also consisted of how dancers wanted a certain piece/routine to be portrayed to the audience and was mentioned by dancers in the oldest age cohort (13-14 years). This is illustrated in the following response provided by Dancer 15:

It's [Imagery] of the way you want other people to see how you're dancing, like if you're reaching for help or something else that is not as desperate so it's kind of the way you want other people to see how you dance.

For emotion, only dancers 13-14-years of age imagined the feelings associated with a character/role as well as the emotions related to a particular dance piece. Dancer 15 indicated: "It depends on what the piece is because sometimes we have to imagine a sad mood or a happy mood." Lastly, only dancers 11-12 years of age mentioned imaging stories to accurately portray the behaviors of a character/role.

### **Imagery Characteristics**

This category was further divided into five sub-categories including: a) *duration*, b) *valence*, c) *senses*, d) *vividness*, and e) *imagery changes*.

**Duration.** Dancers indicated executing imagery at various speeds: a) *slow* ( $n = 10$  dancers), b) *real-time* ( $n = 3$ ) and c) *fast* ( $n = 1$ ). All age cohorts, except the 11-12 year olds, created images at a slower speed to capture every detail involved in a movement. Further, all age cohorts, except the 13-14 year olds, also created images in real-time as it was easier to transfer such images into physical practice. Lastly, one 11-12 year old dancer mentioned using imagery at a fast speed as it would require too much time to imagine a full routine in real-time.

**Valence.** Valence considers both *positive* ( $n = 23$ ) and *negative* ( $n = 11$ ) images. All four age cohorts indicated using positive images for various purposes, such as to improve technique, and to increase confidence and motivation. Similarly, dancers from all age groups mentioned engaging in negative images such as acquiring an injury (e.g. “I imagine I could injure myself and not be able to dance”; Dancer 12), making mistakes (e.g., “I imagine what if I’m on stage and get stuck on one of the steps”; Dancer 1), and doubting one’s abilities (e.g., “I’m in the backroom thinking what if I mess this up”; Dancer 9). Dancer 8 explained: “If you imagine that you’re going to hurt yourself, then the move that you think you’re going to hurt yourself on, you’re not going to do it the best you can, it’s not going to look as good.”

Dancers also indicated that good performance is not always a result of positive images: “I don’t really think of all the negative images makes it worse [performance]. It makes me better. If you have all positive images you’re never going to get better. It’s like always being at 100%”; Dancer 10. In addition, dancers mentioned forming negatives,

however explained that these images were perceived as motivational or were required to effectively perform a routine.

**Senses.** Dancers' images were multisensory in nature incorporating *visual* ( $n = 12$ ), *kinesthetic* ( $n = 10$ ) and *auditory* ( $n = 8$ ) images. For visual imagery, dancers imaged from both an internal and external perspective. The middle age groups (9-12 years) reported using imagery from an internal perspective to feel comfortable being watched by others. All four age cohorts engaged in imagery from an external perspective in order to visualize the appearance of a particular movement. Dancer 3 noted: "I can see my whole body, I can see myself dancing but it looks like someone else is watching me. So I don't see the other person watching me, I see myself."

Kinesthetic images ( $n = 10$ ) were mentioned by the three oldest age groups (9-14 years) and involved images of the physical feelings associated with a movement as well as images of texture (e.g., "I imagine pulling cheese with my toes"; Dancer 10), resistance (e.g., "I imagine pushing through water"; Dancer 13), and pulling (e.g., "I feel like a giant is pulling my arms up; Dancer 2). All four age cohorts noted incorporating sounds (auditory imagery,  $n = 8$ ) into their imagery in the form of self-talk (e.g., "Did I do that step good or not?"; Dancer 2) and music (e.g., "I hear the music so I know what tunes to go on"; Dancer 3).

**Vividness.** This sub-category inductively emerged from the analysis. Two dancers in the 11-12 and 13-14 year old age cohorts indicated that their images were vivid in nature, particularly when imaging at a slower speed. Dancer 7 provides the following quote: "When I go slower I can imagine it more, I can see it better."

**Imagery changes.** Six dancers from two age cohorts (7-8 years and 13-14 years)

indicated changes in imagery from when they first started dancing. The youngest age group (7-8 years) initially used imagery for learning purposes. They now image to become the best. Alternatively, dancers in the oldest age group (13-14 years) initially imaged the final picture of a movement, whereas now they image the process of how a movement is executed. Dancer 13 provides an example in the following comment:

I think when you're younger you focus more on the final picture, you would look at a jump and you would see the final split. But I think as I get older I look at the details as to how I got there and imagining doing that helps you become a more mature dancer.

Dancers in this oldest age cohort also indicated that the content of their images had changed from negative to more positive as their dance skills have evolved and they have acquired more experience.

### **Why**

Why refers to the reasoning behind dancers' images and consists of the following categories: a) *cognitive*, b) *motivational*, c) *artistic* and d) *enjoyment*. Furthermore, given one imagery type can be used to achieve multiple outcomes or vice-versa (Evans et al., 2004; Nordin & Cumming, 2008); the following section provides the types of imagery associated with each category.

**Cognitive.** Dancers engaged in imagery for cognitive reasons such as for a) *learning and improving* ( $n = 17$ ), b) *reviewing* ( $n = 4$ ), d) *memorizing* ( $n = 3$ ), e) *organizing* ( $n = 2$ ), f) *fixing mistakes* ( $n = 8$ ) and g) *avoiding mistakes* ( $n = 4$ ).

All four age cohorts indicated using imagery to improve various aspects of performance (e.g., quality of movement, to enhance posture and timing) as well as to

learn/understand a movement or step. Both technique and metaphorical imagery was used for learning and improving. All age cohorts, except the 11-12 year olds, mentioned using imagery to review a routine prior to going on stage. Only the two younger age groups (7-10 years) noted using imagery for memorization. For instance, Dancer 2 noted: “Once you learn all of those dances on choreo week, it’s very stressful so I have these like folders in my head so like each dance they go in a folder, so I remember them each time.” Dancers engaged in technique imagery for all three of these purposes (learning, reviewing and memorizing).

Given most dancers participated in more than one style, dancers 9-10 years noted using imagery to organize each routine by mentally separating them into their respective styles. Dancer 2 provided this example:

I have folders for each dance style. For example, I have Saturdays, Wednesdays and Mondays. So on Monday, I have my solo which is jazz, Saturdays is jazz and same with Wednesdays. So I take all of those days from dance and I just put all of those dances into one folder for jazz.

All age cohorts, except the 13-14 year olds, mentioned using imagery to fix a mistake in order to prevent the same mistake from reoccurring, and only two age cohorts (9-12 years) used imagery to avoid making a mistake or “freezing” on stage. Dancers used both technique and feedback imagery to fix or avoid mistakes.

**Motivational.** This category consists of six sub-categories which include a) to *increase self-confidence* ( $n = 4$ ), b) to *reduce anxiety* ( $n = 9$ ), c) to *seek encouragement* ( $n = 7$ ), c) for *goal achievement* ( $n = 8$ ), d) to *relieve stress* ( $n = 1$ ) and e) to *focus* ( $n = 4$ ). Dancers from all age cohorts, except the 13-14 year olds, used imagery to increase

self-confidence prior to competing/performing in front of a large audience and to feel good about one's performance. Goal imagery was used for increasing confidence. All four age cohorts reported using imagery to reduce anxiety such as prior to an upcoming performance or competition, during practice, and when forgetting a step. Various types of imagery were used including metaphorical imagery, feedback imagery and technique imagery. Dancer 11 describes a metaphorical image to help calm her nerves: "If I get nervous, which I do a lot, I just imagine the audience as something I really like. For instance, pugs, I think they are adorable, it makes me feel happier." Alternatively, Dancer 9 noted: "I imagine my mom telling me just to deep breathe when you get nervous and I would just think of that and it would make me calm."

All four age cohorts indicated using imagery for encouragement when feeling fatigued or when experiencing difficulties and self-doubt (e.g., "I would picture me doing hip-hop because it's my favorite style so it helps me get more energetic"; Dancer 21). Both technique imagery and feedback imagery were used to achieve this purpose.

For goal achievement, all age cohorts engaged in imagery to work towards a desired outcome such as performing well (e.g., "I use it [imagery] to get better and work my way up to the top"; Dancer 21), executing proper technique (e.g., "I'll imagine my legs going higher and my feet more pointed"; Dancer 16), and reaching high technical standards (e.g., "Whenever I watch her [another dancer], I imagine that one day I can become her"; Dancer 21). Dancers incorporated both technique and goal imagery to strive towards a particular goal.

Dancers from all four age cohorts used imagery to focus on executing a routine (e.g. "I just imagine that nobody is there so I can just dance; Dancer 21) or to regain

focus when performing poorly (e.g., “When a few mishaps happened, we were able to snap back into what we were able to do because we imagined our dances”; Dancer 14). Lastly, only the 11-12-year old group used imagery to relieve stress just prior to performing. Technique and feedback images were incorporated to serve both of these purposes.

**Artistic.** Dancers engaged in imagery for artistic reasons such as a) to *seek inspiration* ( $n = 6$ ), b) to *portray emotion* ( $n = 2$ ), c) to *take on a character/role* ( $n = 4$ ), and d) for *appearance* ( $n = 2$ ). Dancers from all age cohorts, save the 9-10 year olds, indicated using imagery to seek inspiration for new choreography. Dancers noted that technique and feedback imagery contributed to accomplishing this purpose. Dancer 17 explained:

When I hear songs on the radio, I imagine myself dancing and if I like what I see in my head, maybe I decide I want to choreograph something to this song and do it this way. So that determines what.

The 13-14-year old age cohort reported using imagery to portray emotions to an audience: “In lyrical and contemporary we have a lot of reaches and stuff so you have to imagine reaching for something that’s not actually there so you can have emotion on your face”; Dancer 15.

The youngest three cohorts (7-12 years) used imagery for the purpose of taking on a character/role in a routine. Dancer 4 noted; “I imagine that I’m actually that person [character] and how they feel and how they would actually live so I could perform properly and make it look real.” Lastly, only dancers in the 13-14-year old age group reported using imagery to appear or portray herself to the audience in a desired manner.

**Enjoyment.** Only two dancers in the oldest age cohorts (11-12 and 13-14 years) described using imagery because it was fun and made them happy. Dancer 11 commented: “I just make up dances and imagine I’m performing them because it makes me happy.” Dancers used both technique and metaphorical images for personal satisfaction and enjoyment. For instance, dancers indicated using metaphorical imagery to engage in pretend activities in dance class (e.g., cat and mouse).

### **How**

How dancers image inductively emerged through the analysis and represents three categories: a) *imagery triggers* ( $n = 7$ ), b) *creating videos/stories* ( $n = 6$ ) and c) *layering images* ( $n = 5$ ). Only the older age cohorts (11-14 years) indicated imagery triggers that contributed to the formation of their images such as music (e.g., “I start to imagine things when I’m listening to music; Dancer 17), watching others (e.g., “When we are in groups I’ll watch them do it [peers], then I imagine what they’re doing”; Dancer 5), and free time (e.g., “In my free time...I imagine myself dancing”; Dancer 17). Only the 11-12 age group indicated forming images either by creating a video or story in their mind. Dancer 2 explained:

I would take a video in my head of how the teacher taught it and I would review the dance in the studio so when I go on stage and I do the dance, I just put that clip in my head and I just do it how the clip goes.

Lastly, all age cohorts seemed to create layers of images consisting of various elements.

For instance, dancers first imagined the technique of a movement and then added layers of images pertaining to the environment and emotions.

## Discussion

The present study provides insight on the 4 W's of young female dancers' use of imagery as well as *how* dancers image. The age differences found between the four age cohorts (7-8, 9-10, 11-12, 13-14) are also discussed. In support of previous imagery research, several findings from the current study are similar to those identified in both the adult dance and youth sport domains. However, some results emerging from the current study are novel and provide information on the imagery types and functions specific to young female dancers.

In regard to *where* dancers image, participants from all age cohorts referred to using imagery in the studio and at competitions. Similar findings are noted in the sport imagery literature as youth athletes report using imagery in both training and competition (Munroe-Chandler, Hall, Fishburne, & Strachan, 2007). Young dancers also reported using imagery outside of dance settings such as at home or at school. However, age differences were noted as only the older age cohorts (11-14 years) indicated using imagery at home and all age cohorts, except the 9-10 year olds, used imagery at school. Munroe-Chandler, Hall, Fishburne, and Strachan (2007) found similar results when qualitatively investigating youth athletes' imagery use; such that 7-8 year old athletes did not indicate using imagery outside of practice situations or before competitions. Given children begin participating in organized sport around the age of seven (Côté & Fraser-Thomas, 2016), Munroe-Chandler, Hall, Fishburne, and Strachan (2007) suggested that children at this age were likely sampling other sports and therefore were not engaging in imagery outside of sport. Similarly, dancers in the younger age cohorts may also be

sampling various sports/activities and therefore may not be engaging in dance imagery outside of its respective setting.

Although not specific to the dance domain, dancers from all age groups indicated using imagery at school (e.g., technique to improve reading ability or to solve a math problem). In addition, the dancers reported using imagery in other sports. For example, one dancer indicated imaging herself dancing while kicking a soccer ball as it resembled executing a *developé* in dance. These findings may provide some initial evidence that the images used by performers in dance are transferrable to other domains (Hanrahan & Vergeer, 2000). Additional research in this area is warranted.

Consistent with previous adult findings regarding *when* dancers image (Nordin & Cumming, 2005), all dancers in the current study reported using imagery prior to going on stage, while dancing, and during practice. Notably, young dancers also mentioned using imagery when experiencing difficulties, a finding novel to the young dancers. Bandura's social cognitive theory may serve useful in explaining this unique finding. According to Bandura (1977), self-efficacy is the belief in one's ability to execute a specific task. Past performance accomplishments (i.e., mastery experiences) are the most influential source of self-efficacy; past performances that are perceived as successful increase one's self-efficacy whereas unsuccessful performances decrease self-efficacy (Bandura, 1977). Given previous research examined imagery use with adult professional dancers (Hanrahan & Vergeer, 2000; Nordin & Cumming, 2005), they may have experienced more positive performance outcomes and have acquired more dance experience resulting in higher efficacy when compared to young dancers. As a result,

professional dancers may have a high self-efficacy toward overcoming difficulties and may not require imagery for this purpose.

In regard to *what*, young female dancers reported creating images similar to the imagery types used in the sport domain. Technique imagery most closely resembles both the CS and CG imagery types discussed in the sport literature (Hall et al., 1998; Paivio, 1985) as it refers to imaging the technique of specific movements, steps and routines. Goal imagery is similar to the MS imagery type reported in sport as it refers to imaging various types of dance related goals (outcome, process and performance goals). Despite the similarities to the sport literature, dancers engaged in additional imagery types such as metaphorical, feedback, environmental and character/role imagery. Such findings are in line with previous imagery research indicating that adult dancers engage in additional imagery types that go beyond those used in sport (Fish et al., 2004; Nordin & Cumming, 2005; Nordin & Cumming, 2006a).

Unique to young dancers is the use of feedback imagery, which refers to images of corrections given by teachers, critiquing one's performance, self-talk, movement modeling and encouragement/guidance given by parents. Research in the area of motor learning provides a possible explanation for why young dancers, but not adult dancers, may be using this type of imagery. Sullivan, Kantak, and Burtner (2008) compared adults and children on different levels of feedback provided during practice to determine its influence on performance during a retention test. Adults who practiced with reduced frequency of feedback performed more consistently during the retention test when compared to adults who practiced with 100% feedback. Alternatively, children who received 100% feedback during practice performed more consistently during the retention

test when compared to those who received reduced feedback. Based on these findings, it is plausible that young dancers may use feedback imagery as it can contribute to performance achievement. Given feedback is beneficial to children during practice, dance teachers should continuously provide feedback during class to not only improve performance but to allow dancers to incorporate feedback into their images.

Specific to the encouragement and guidance provided by parents, dancers may have formed such images in order to improve self-confidence. According to Côté and Fraser-Thomas (2016), parental feedback is crucial to the development of children's self-esteem, competence and achievement. Dancers from the current study also indicated using images of movement modeling, which involved the technique of other dancers or themselves performing at a high technical standard. From a practical standpoint, teachers should allow a mature dancer to perform a movement or step for their younger counterparts to allow the young dancer to gain an understanding of the appropriate technique. Once proper technique has been established, young dancers should be encouraged to imagine themselves performing the same movement with correct technique. Such exercises can assist with mastering movements (Franklin, 2013) and may encourage the formation of movement modeling images.

For metaphorical imagery, dancers from all age cohorts reported images involving objects not actually present and actions that cannot be performed in order to improve the quality of a movement. Such images were noted by dancers as effective as they provided a greater understanding of what a movement entailed. These findings are consistent with a qualitative study conducted by Nordin and Cumming (2006b) who investigated dancers' imagery development. Professional dancers indicated using metaphorical

imagery when they were younger, no doubt as a result of the metaphorical images being provided by instructors in order to maintain fun and enjoyment. Therefore, dance teachers should incorporate metaphorical images with young dancers as this imagery type seems effective for improving performance. Although not indicated in the sport literature, coaches can incorporate both metaphorical and feedback images in their practices (e.g., a basketball player may imagine themselves on a trampoline in order to reach the basket). Despite the differences between dance and sport, it is suggested that the exchange of knowledge acquired from both domains may be beneficial (Hanrahan & Vergeer, 2000). Future research investigating the use of metaphorical and feedback imagery with youth athletes is warranted.

Although all age groups indicated using metaphorical imagery, several age differences were noted in terms of character/role imagery. All age cohorts formed images of appearance such as the behaviors of a character/role, the qualities of a dance style, or the perception of a movement/routine. However, only the 11-12 year olds indicated imaging stories to portray a certain character/role and only the 13-14 year olds mentioned images of feelings associated with a character/role. According to Piaget and Inhelder (1971), children begin to form images of hypothetical situations between 12-14 years of age. Perhaps the older age cohorts imaged more aspects of character/role imagery when compared to the younger age cohorts as they have developed the cognitive ability to form hypothetical images of a story or the feelings associated with a character/role. Similar results were found with professional dancers who indicated that their imagery had progressed from simple “pictorial” images to images of roles and characters as they got older (Nordin & Cumming, 2005). Such findings support the learning element in the

PETTLEP model (Holmes & Collins, 2001), which provides effective guidelines when developing imagery for both athletes and dancers. The model suggests that imagery content must be reviewed regularly as our memory representations change over time as a result of learning and practice. Dancers and dance instructors should be aware that the content of dancers' images is constantly evolving and should be considered when providing images during practice.

Several findings in regard to imagery characteristics are worth noting. In terms of valence, dancers mentioned their images to be both positive and negative in nature. However, such negative images were not always perceived as debilitating and in some cases, were required for motivation. For instance, negative images were noted as necessary given the purpose of a routine may require a dancer to portray a sad story or negative emotions to the audience. These findings support previous imagery research in that imagery can benefit (facilitate) or hinder (debilitate) performance (Short, Bruggeman, Engel, Marback, Wang, & Willadsen, 2002). Dancers should determine whether their images are facilitating or debilitating towards their performance and change those that are debilitating (Short et al., 2002). For imagery perspective, only the two middle groups (9-12 years) used imagery from an internal perspective whereas all dancers indicated imaging from an external perspective. Although these findings may indicate a preference for an external perspective, dancers should be encouraged to use the perspective that allows them to image content most easily (Williams, Cooley, Newell, Weibull, & Cumming, 2013). Therefore, perhaps simply educating young dancers on both imagery perspectives will allow for more effective imagery.

Consistent with previous imagery research (Munroe-Chandler, Hall, Fishburne, & Strachan, 2007; Nordin & Cumming, 2005), dancers in the current study engaged in imagery for both cognitive and motivational purposes. Most notable are the cognitive reasons which included learning and improving, as well as memorizing and organizing. It is not surprising that young dancers used imagery for organizational purposes as most participants engaged in several different dance styles, each involving numerous routines. For memorization, only the younger age groups (7-10 years) used imagery in order to memorize a step or routine. One possible explanation may be that the younger dancers are still learning the standard movements within each dance style and may require imagery to memorize such movements. Contrastingly, the older age cohorts may not require imagery for this purpose as they may be familiar with these movements due to more years of experience. In addition, both fixing and avoiding mistakes were also classified as cognitive reasons for engaging in imagery, a finding not reported in previous research with professional dancers (Nordin & Cumming, 2005). Given mistakes are not as common with such elite dancers, they may not require imagery for the purpose of fixing or avoiding mistakes. Furthermore, due to years of experience, professional dancers may have developed muscle memory to perform movements correctly (Driskell, Copper, & Moran, 1994).

Similar to adult dancers, young dancers reported using imagery for artistic reasons such as to seek inspiration, to portray emotion, to take on a character/role and for appearance. Such findings further support the notion that dance requires more than technique, as an artistic component is required to perform well (Hanrahan & Vergeer, 2000). Unique to the present study was young dancers' use of imagery for enjoyment

purposes. Dancers indicated creating dance routines in their mind while listening to the radio as it was entertaining and made them feel happy. However, only the older age cohorts (11-14 years) mentioned using imagery for this reason. Given the improvement of movement can result in the formation of dances (Davis, 1995), one possible explanation may be that dancers in the older age cohorts may have the technical ability to start developing choreographies of their own and may imagine themselves performing a new routine.

From the results, it is clearly evident that one imagery type (*what*) can serve multiple outcomes, further supporting the relationship between imagery types and imagery functions (Calmels et al., 2003; Fish et al., 2004; Nordin & Cumming, 2005, Short, Monsma, & Short, 2004). For instance, dancers used technique imagery for cognitive reasons such as learning, reviewing, and organizing. In regard to motivational reasons, goal imagery was used to increase confidence whereas technique, motivational, and feedback imagery was used to reduce anxiety. Artistic reasons involved technique and feedback imagery to seek inspiration and lastly, both technique and metaphorical images for enjoyment. Based on these findings, dance instructors should consider providing multiple images for one movement as dancers may differ in terms of the imagery content required to achieve a certain outcome.

Throughout the focus group sessions, dancers indicated *how* they use imagery and such findings provide practical implications for dancers and dance instructors.

Considering only the oldest age cohort (13-14) created images due to triggers (e.g., music, watching others, free time), instructors may consider incorporating these triggers into dance training. Specifically, a dance instructor may ask students to listen to the

music of a specific routine and imagine themselves performing to that music.

Furthermore, only the 11-12 year olds reported creating videos or stories in order to form images. By allowing the opportunity for dancers to take mental videos of older dancers or by providing actual dance videos, dance instructors can encourage the use of imagery. Lastly, dancers from all age groups formed layers of different types of images. Given dancers created these layers subconsciously, dancers can acquire greater ability to layer their images through layered stimulus response training (LSRT; Williams, Cooley, & Cumming, 2013). LSRT is designed to improve imagery ability as it allows dancers to generate and control their images more effectively by incorporating different aspects of imagery through the process of layering. For example, a dancer may image the music of a routine (layer 1) and may further develop the image by adding a layer of the physical feelings associated with a movement (layer 2) and the emotions necessary to portray a certain character (layer 3). This process allows images to closely resemble reality, ultimately enhancing performance (Cumming et al., 2017).

Despite the strengths of the current study, which includes support of previous adult dance imagery research and novel findings for a young dance population, there are several limitations that should be noted. First, only female dancers were recruited for the study which may limit the generalizability of the findings. Although Hall (2001) stated that gender probably does not greatly affect imagery use, this was specific to the adult population. More recent research with young athletes noted gender differences with respect to imagery use (Munroe-Chandler, Hall, Fishburne, & Strachan, 2007; Munroe-Chandler, Hall, Fishburne, O, & Hall, 2007). Despite girls outnumbering boys 10 to 1 in dance classes (Mennesson, 2009), examining imagery use among male youth dancers is

warranted. Second, each focus group was comprised of dancers from only one studio. Although Krueger and Casey (2009) suggest variation amongst participants in order to gain contrasting opinions, there is a benefit to participants being all from one studio as they may have felt more comfortable expressing their opinions in front of dancers with whom they were already familiar. Third, dancers' imagery ability was not measured prior to the focus group discussions. Given imagery ability can influence the extent to which imagery is used effectively (Williams et al., 2013), future research should include an imagery ability measure to ensure they are able to adequately image. Last, the current study was designed to investigate imagery use across different ages and dance styles. Future research should investigate young dancers' imagery use specifically targeting dancers of a certain age and dance style.

Despite the noted limitations, the present study provides an understanding of young dancers' use of imagery as well as age differences between 7-14 years of age. Given no empirical study has been conducted specifically investigating young dancers' use of imagery, findings from the present study provides an avenue for future research. Knowing where, when, what, why and how young female dancers image, imagery measurements for this population can be developed. The present study also includes several practical implications that can be utilized by dance instructors. Dance instructors can review findings from this study in order to determine which imagery types are most pertinent to young dancers. In addition, dance instructors can incorporate effective imagery types when working with a student toward achieving a particular outcome. For example, if a student is experiencing anxiety prior to going on stage, based on the current results, dance instructors can encourage dancers to use metaphorical, feedback or

technique imagery to reduce anxiety. Given dance has been reported as a popular activity for girls in physical education classes (Gao, Zhang & Podlog, 2014), findings from the current study can also provide practical implications for physical education teachers. In order to keep dance classes fun and interesting, physical education teachers can incorporate technique and metaphorical imagery as such images were used for enjoyment purposes by young female dancers. Because enjoyment is a determination of physical activity participation (Weiss, Corbin, & Pangrazi, 2000), physical education teachers can use imagery as a mean to increase girls' physical activity levels.

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## FIGURES

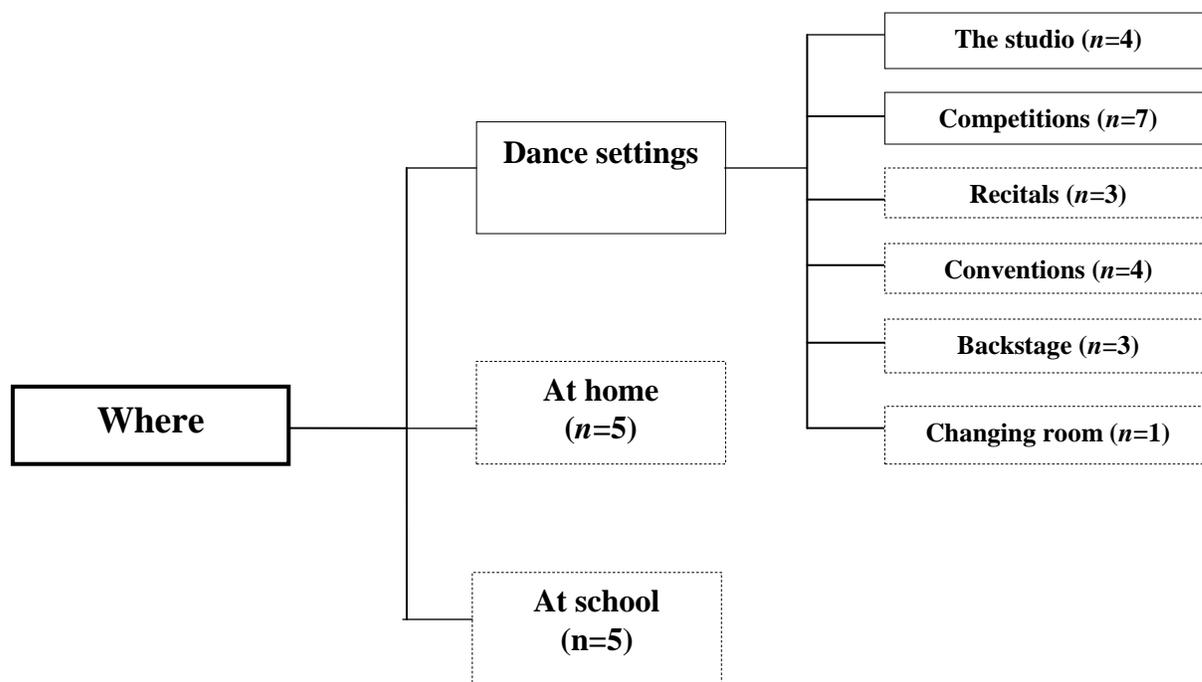


Figure 1. A Framework for Where Young Female Dancers' use Imagery

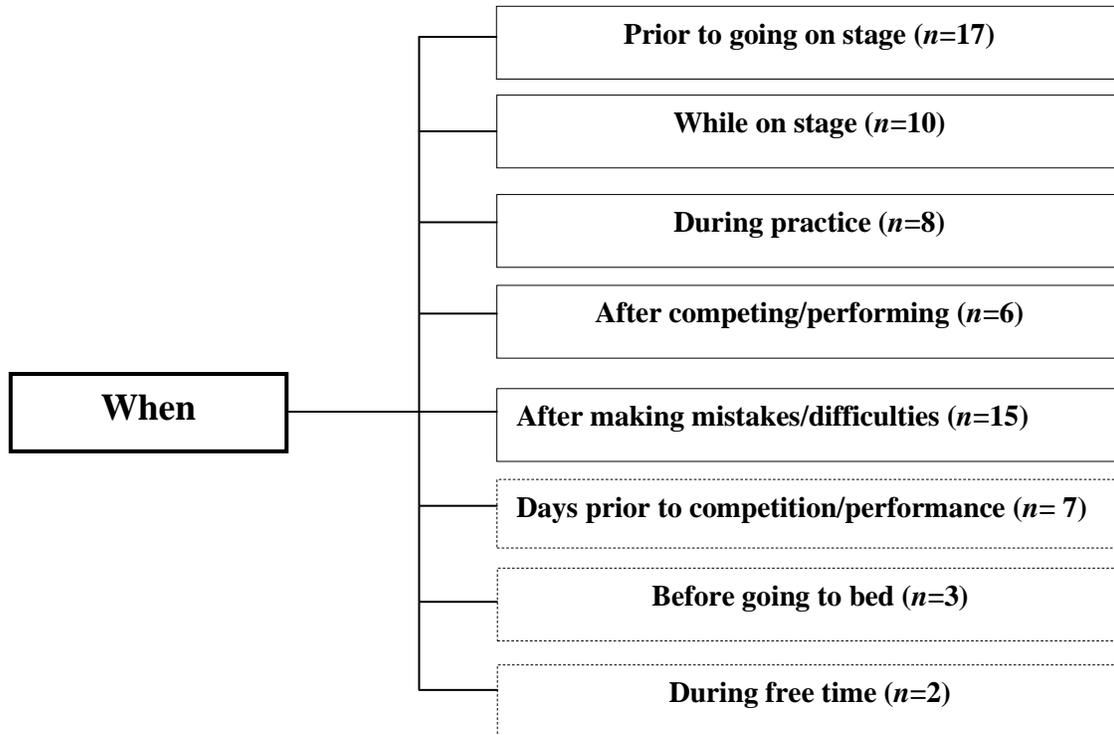


Figure 2. A Framework for When Young Female Dancers' use Imagery

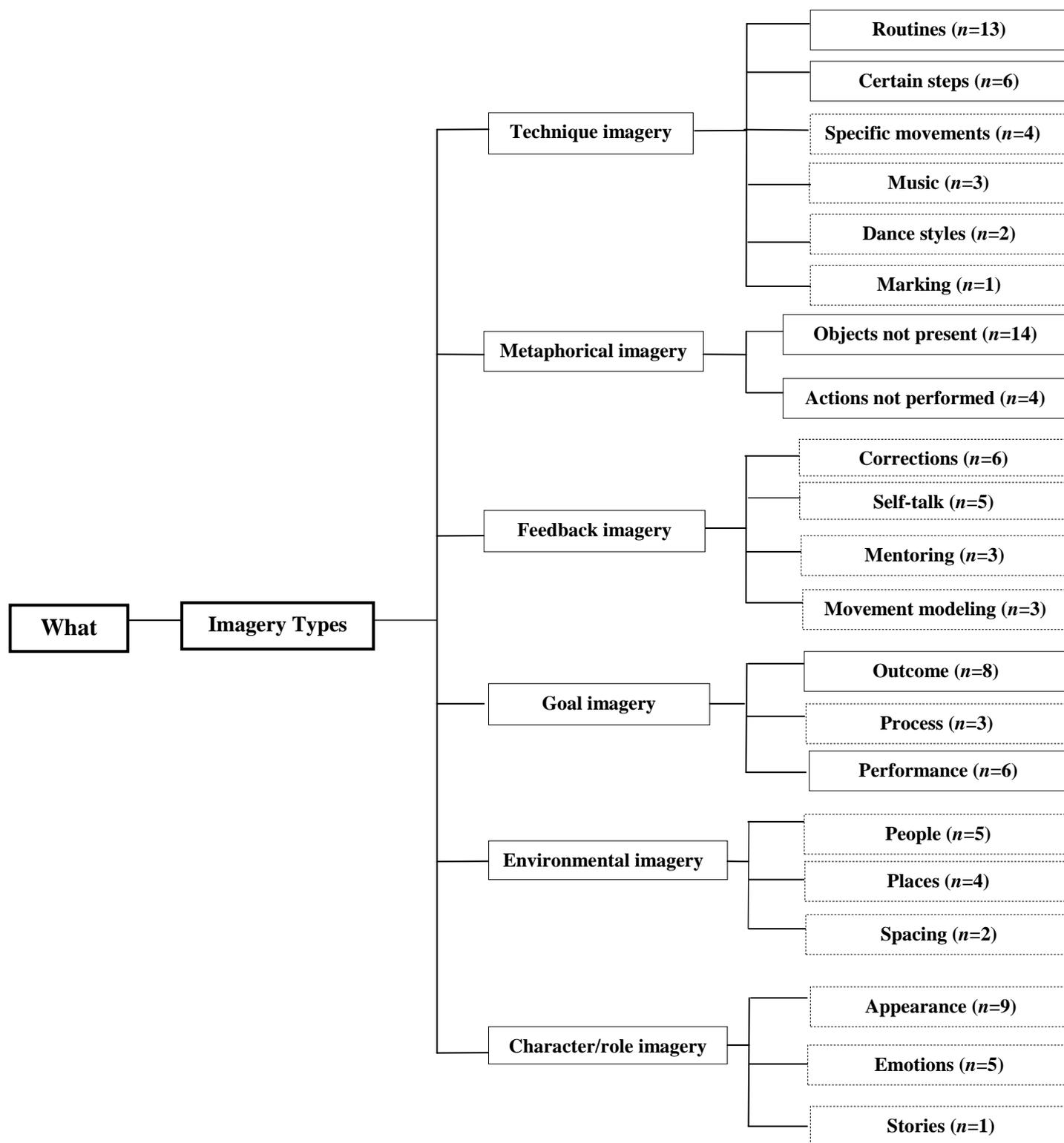


Figure 3a. A Framework for What Young Female Dancers' are Imaging.

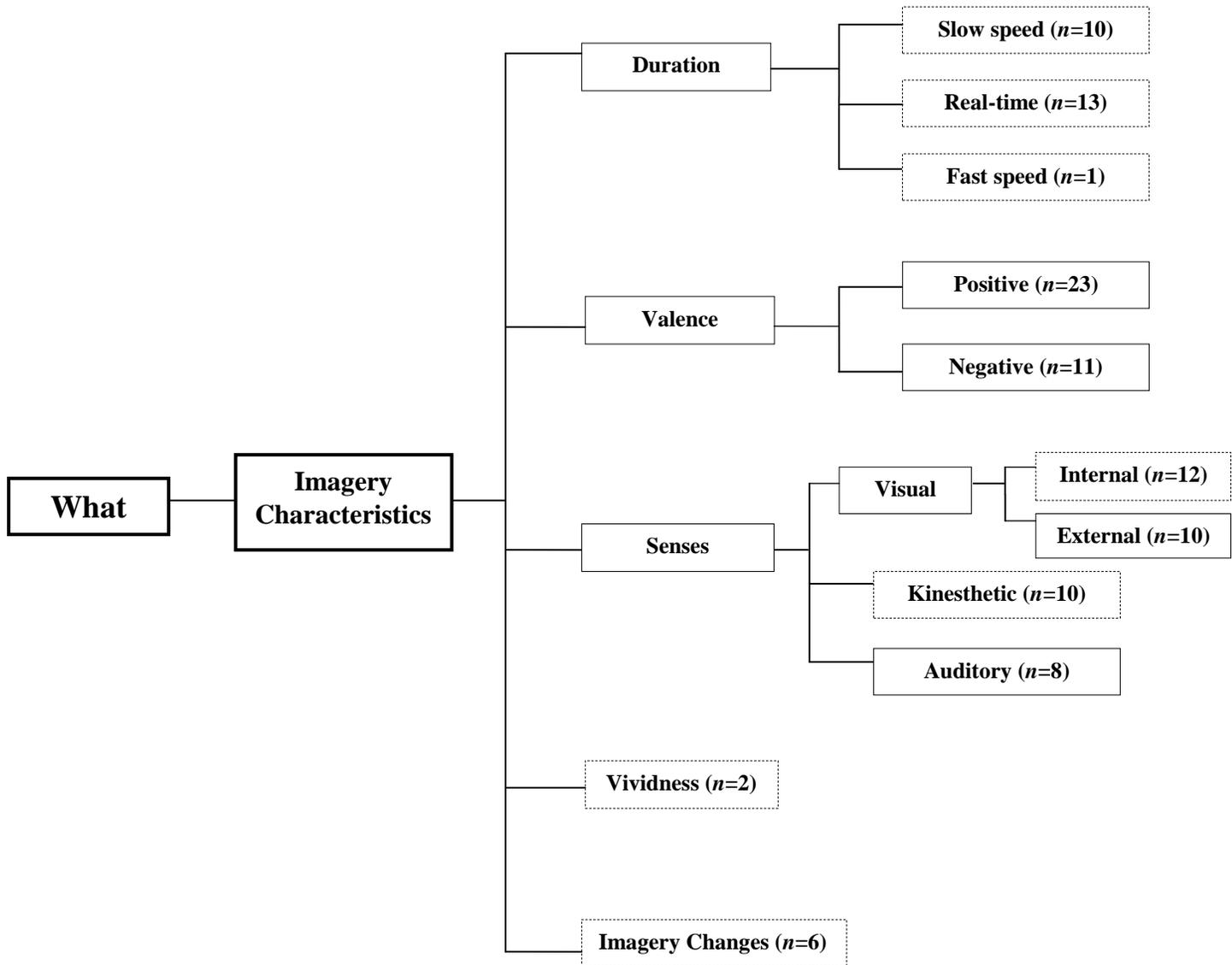


Figure 3b. A Framework for What Young Female Dancers' are Imaging.

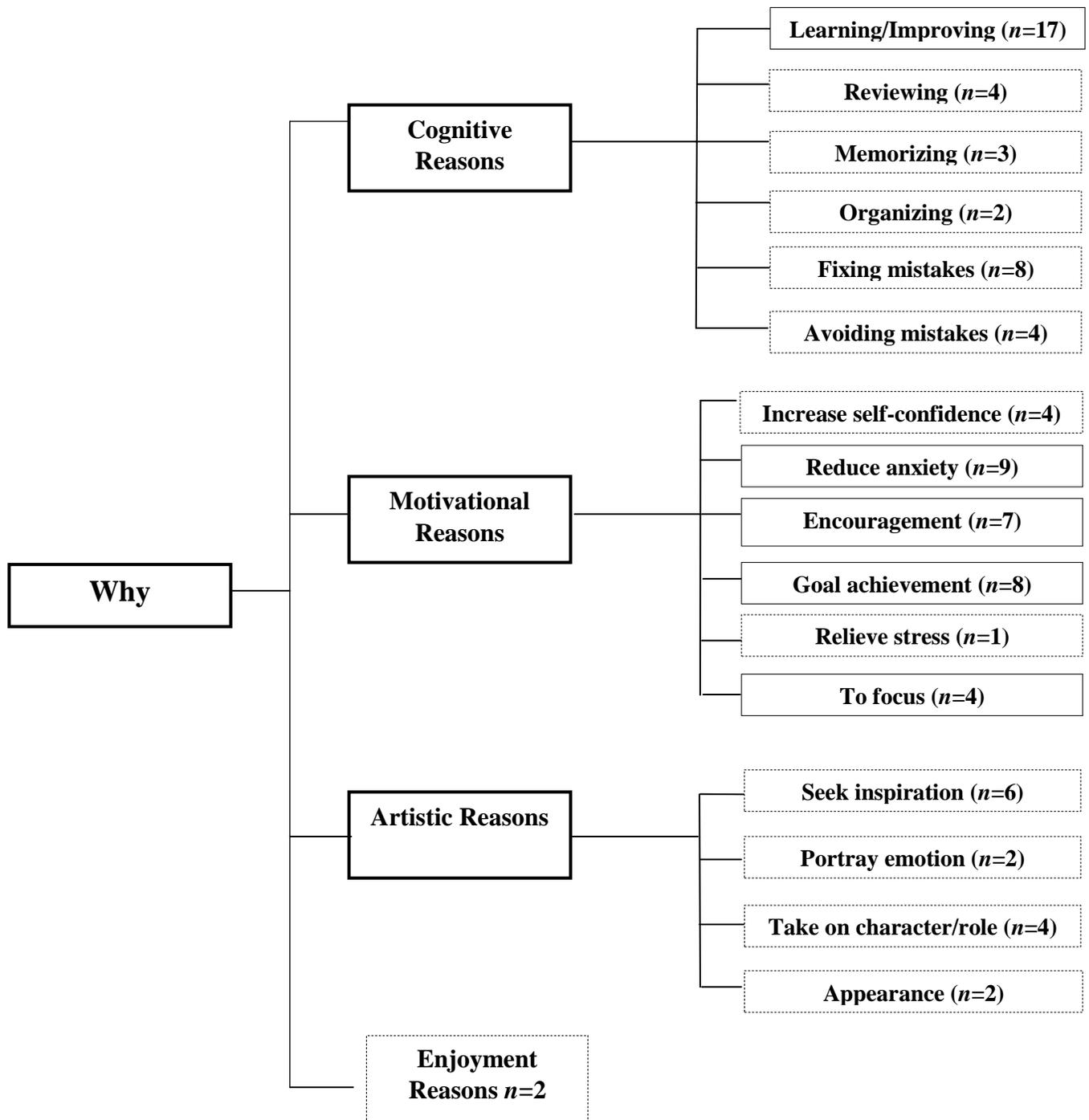


Figure 4. A Framework for Why Young Female Dancers' use Imagery

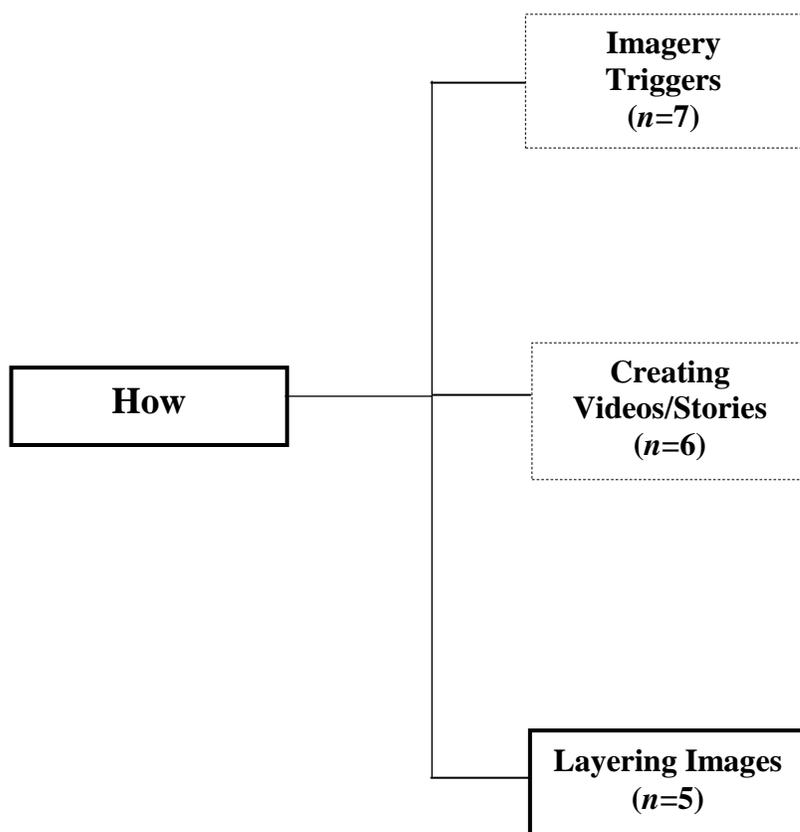


Figure 5. A Framework for How Young Female Dancers' use Imagery

## REVIEW OF LITERATURE

### **Introduction**

Mental skills are strategies used to initiate and sustain performance (Krane & Williams, 2006). In the dance domain, mental skills can contribute to controlling arousal and concentration and improving self-confidence and self-talk (Hanrahan, 1996). One mental skill which has been shown to impact dance performance is imagery. Vealy and Greenleaf (2010) describe imagery as the creation or recreation of an experience in one's mind. In dance, imagery can be used to mentally rehearse a routine, understand and reinforce movement, inspire strong emotions and lower arousal levels (Pavlik & Nordin-Bates, 2016). In an in-depth study examining where, when, what and why professional ballet dancers use imagery, Nordin and Cumming (2005a) found dancers reported using several types of imagery such as technique, goals, role and movement quality, and mastery. In addition, Krasnow, Chatfield, Barr, Jensen and Dufek (1997) found implementing imagery in combination with dance training resulted in better performance over time than either alone. It is evident that the benefits for imagery use in the dance domain can be far reaching.

In addition to the studio, dance is also practiced in physical education classes. Dance plays an important part of physical education as it allows children to gain a sense of rhythm, space and time (Zrnzevic, Lakušić, & Zrnzević, 2015). Further, dance has been reported as a popular activity for young girls (grades 3-6) during physical education classes (Gao, Zhang, & Padlog, 2014). Given girls' participation in physical activity (PA) and sport is lower compared to boys (CDC, 2011), it is especially important to examine strategies that can impact girls' involvement in dance. Imagery may be one such strategy.

According to Overby (1991), imagery can enhance children's memory for movement and can be utilized by children as young as three years of age. In addition, Munroe-Chandler, Hall, Fishburne and Strachan (2007) found young athletes (7-14 years of age) reported using all five sport imagery types similar to their adult counterparts. However, such imagery types vary by age and gender, suggesting that children may use different or additional types of imagery compared to that of adults.

Given the only in-depth study of dancers' imagery use were with participants 22-50 years of age, the purpose of the current in-depth qualitative study is to investigate the 4 W's of young female dancers' imagery use (Where, When, Why and What young dancers are imaging). Findings from this proposed study will provide valuable information when conducting dance and PA interventions as well as practical application for dance instructors. The literature review will be divided into three main sections. The first section will provide a broad overview of imagery and its theories. The second section will describe imagery specific to the sport setting, while the last section will provide an overview of the imagery research in the dance domain.

### **Imagery**

Imagery, commonly referred to as the "central pillar of applied sport psychology" (Perry & Morris, 1995, p. 339), is considered one of the most important mental skills in the athletic domain (Rodgers, Hall, & Buckloz, 1991). In its infancy, imagery research yielded empirical support for its benefits in the competitive sport realm to increase athlete's self-confidence, self-efficacy, skill acquisition and attention (Cumming & Ramsey, 2009; Munroe-Chandler & Hall, 2016). Imagery can be performed using various senses such as visual, kinesthetic, auditory, olfactory and tactile or in any

combination of such senses (Munroe-Chandler & Hall 2016). Given the multi-sensory nature of imagery, White and Hardy (1998) proposed the following definition:

[Imagery is] “an experience that mimics real experience. We can be aware of seeing an image, feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing. Sometimes people find that it helps to close their eyes. It differs from our dreams in that we are awake and conscious when we form an image.” (p. 389)

The definition suggests that imagery is implemented under conscious control as it allows individuals to retrieve images from long-term memory that can then be created or recreated (Holmes & Calmels, 2008).

While its contribution to sport was well underway, imagery research began to flourish in other movement domains such as dance (Overby, 1990). As dance imagery was introduced, several similarities and differences to that of sport were noted. Although, both athletes and dancers train their bodies to full potential and aim for high technical standards (Hays, 2002), the way in which dancers and athletes perceived the word “imagery” is rather different (Overby, 1990). In sport, imagery is depicted as a mental tool that allows one’s skills, situations and feelings to be rehearsed (Murphy & Martin, 2002). Alternatively, dance images appear more indirect or metaphorical in nature as they incorporate external objects not actually present in order to improve a movement (Overby, 1990). Therefore, in addition to the aforementioned definition provided by White and Hardy, 1998, Overby (2011) proposed an imagery definition more relevant to the dance context:

Dance imagery is the deliberate use of the senses to rehearse or envision a particular outcome mentally, in the absence of, or in combination with, overt physical movement. The images may be constructed of real, or metaphorical movements, objects, events or processes. (p. 9)

### **Children and Imagery Use**

When implementing imagery research with children, focus group studies (Munroe-Chandler, Hall, Fishburne & Strachan, 2007; Munroe-Chandler, Hall, Fishburne, O, & Hall; 2007) have used the stages of cognitive development to provide insight regarding children's imagery ability as it may vary between each stage of cognitive development. Jean Piaget and Barbel Inhelder (1971) presented four stages of cognitive development children may encounter between early and late childhood. According to Piaget and Inhelder, children are unable to form mental images prior to 2-3 years of age (sensorimotor stage). Children between the ages of 4-7 years are considered to fall under the preoperational stage and are capable of imaging objects and situations not actually present, however they are unable to identify their transformations. For example, children can form an image of a glass of milk sitting on a table, but are unable to image a situation in which the glass is knocked over. Therefore, Piaget concluded children in the preoperational stage are only capable of performing "static" images.

Children are able to form transformational and kinesthetic images (imaging sensations produced during movement execution; Afremow, Overby, & Vadocz, 1997) in the concrete operational stage (8-11 years of age). However, children in this stage require physical experience in order to create an image. For instance, if a child has never experienced kicking a soccer ball, they will not be able to form an image of this

experience. Although Vealey and Greenleaf (2010) state imagery is created or recreated, this is generalized to the adult population and does not describe children (8-11 yrs of age) who are only able to recreate images from experience. Lastly, children in the formal operational stage (12-14 years) are capable of imaging hypothetical situations and are able to operate on and in between classes of objects. It is clear that as children develop between the ages of 7-14 years they undergo many cognitive processing changes that may influence their ability to image. However, it should be noted that children may be more cognitively advanced in one domain than another (Piaget & Inhelder, 1971). For instance, a child may perform one task on a concrete operational level and another on a formal operational level. Therefore, these stages should be considered as guidelines as opposed to absolutes.

### **Imagery Theories and Models**

Given the use of imagery has been examined in a variety of domains (e.g., sport, exercise, dance, music), several general theories and models have been developed to explain imagery as a form of mental practice and its impact on performance (Hall, 2001). A theory is defined as a “systematic arrangement of fundamental principles that provides a basis for explaining a phenomenon” (Martin, Moritz, & Hall, 1999, p. 248). A theory can be distinguished from a model as it attempts to *explain* a phenomenon (Morris, Spittle, & Watt, 2005), whereas a model *represents* a phenomenon (Chaplin & Krawiec, 1974). Although the following theories and models are not without limitations, they provide a foundation for current research.

**Psychoneuromuscular theory.** According to the psychoneuromuscular theory (Driskell, Copper, & Moran, 1994), imaging a particular movement can activate muscle

innervations similar to those executed during physical movement, but to a lesser degree. When a specific movement is imaged, impulses are sent to target muscles, which are then fired in correct sequence, as if actually performing the movement. It is also suggested that the same neuromotor pathways used during physical movement are also involved in mental practice. As a result, muscle memory is strengthened and the appropriate coordination patterns are improved. It is evident that the effects of imagery on the brain are similar to the effects of actual performance, a concept known as functional equivalence (Jeannerod, 1995).

**Symbolic learning theory.** Sackett's (1934) symbolic learning theory proposes that imagery allows one to better understand and improve a specific movement. Sackett conducted a study to determine whether symbolic rehearsal, in the form of verbal, visual, and kinesthetic imagery or verbalization, is beneficial to the retention of a motor task. As a result, symbolic rehearsal in the form of drawing and thinking were shown to benefit retention. Therefore, Sackett describes imagery as a cognitive coding system that allows for better understanding of the "mental blueprints" involved in movement patterns, resulting in quicker and more efficient performance. However, despite empirical support of the benefits of imagery on strength and motor tasks (Ranganathan, Siemionow, Liu, Sahgal, & Yue, 2004; Smith, Collins, & Holmes, 2003), such findings cannot be explained by the symbolic learning theory as it is limited to tasks that are cognitive or symbolic in nature.

**Bioinformational theory.** Lang's (1979) bioinformational theory supports the role of emotional imagery as a treatment for anxiety disorders by incorporating psychophysiology, the information processing theory and behavioral therapy. Lang

suggests that emotional images evoke efferent outflow (i.e., increased arousal) similar to actual behavior. In support of Lang's theory, Holmes and Collins (2002) examined individual's facial gestures after imaging an anxiety-provoking experience. As a result, recalling anxious experiences through imagery led to expressions of fear and increased arousal. Furthermore, Lang argues that each emotional image contains at least three propositions: stimulus, response and meaning propositions. Propositions are defined as "logical relationships between concepts" (Lang, 1979, p. 499), and represents the meaning of an image as opposed to only the image itself. Stimulus propositions are considered information regarding external stimuli and the context in which they take place. Response propositions represents the responses (cognitive, behavioral, and affective) of an individual to a stimuli and how the individual would react in a real-life situation. Lastly, meaning propositions are described as the relationship between the stimuli and response propositions and the perceived importance of the imaged scene.

**The triple-code model (ISM).** Ahsen (1984) proposes three components involved in the process of shaping images: the image itself (I), the somatic response to the image (S), and the meaning associated with the image (M). The image itself is described as a centrally aroused sensation consisting of all sensational characteristics in the absence of movement execution. Ahsen argues that external objects can be represented in an image based on the capability of the individual experiencing the image to interact and manipulate their imagined environment. The somatic response component involves the psychophysiological changes due to objects or situations caused by the imagined environment. Lastly, Ahsen states that images can hold a degree of significance or meaning and stems from one's history and past experiences. Overall, the components

presented in this model generate the most effective images when they occur in the most natural and useful order (Ahsen, 1984).

### **Imagery in Sport**

According to athletes and coaches, imagery is considered the most popular mental skill to enhance performance and has been examined extensively in the sport domain (Cumming & Williams, 2013). The surge of studies developed in this domain have largely stemmed from sport imagery models and measurement. The following section will present models specific to the sport setting as well as a sport specific measurement tool. The section will conclude with a discussion of the research pertaining to imagery use with young athletes and its corresponding measure.

#### **Sport Imagery Models**

**Analytic framework of imagery effects.** A significant amount of sport imagery research has stemmed from Paivio's (1985) analytic framework for human performance. Paivio proposed that imagery serves both cognitive and motivational functions, operating at a general or specific level. Presented as a 2x2 orthogonal model, the framework consists of two dimensions: the motivational-cognitive contrast and the general-specific contrast (Figure 1). These imagery functions could be distinguished from one another in terms of their content. In terms of motivational functions, motivational general (MG) involves imaging one's physiological and emotional arousal and motivational specific (MS) refers to imaging achieving one's goals. For instance, an athlete may imagine accepting a medal while standing on stage or imagine a successful performance. In terms of cognitive functions, cognitive specific (CS) refers to imaging specific skills and

techniques, while cognitive general (CG) involves imaging strategies, game plans and routines, specifically related to a competitive event. Paivio described his framework as functionally orthogonal, meaning each imagery type could be used independent from one another. For instance, we can image behavioral goals (MS) without thinking about our physiological arousal (MG) or vice versa.

To assess Paivio's (1985) framework, Hall, Mack, Paivio and Hausenblas (1998) conducted a study to assess the motivational and cognitive functions of imagery. As a result, Hall et al. (1998) extended motivational general (MG) imagery to consist of two components, motivational general-arousal (MG-A) and motivational general-mastery (MG-M). MG-A imagery remained as imaging one's arousal and emotions and MG-M was added to include imagery in relation to being in control, confident and mentally tough. As a result, five types of imagery are widely recognized in sport imagery research (CS, CG, MS, MG-M, MG-A). Although the analytic framework presented by Paivio and later extended by Hall et al. (1998) supports much of the imagery literature, it is limiting as it does not account for situational (e.g., sport context) or personal (e.g., imagery ability) factors (Martin et al., 1999). Due to this limitation, the framework is unable to provide insight as to the most effective strategy for using imagery to achieve a particular outcome (e.g., skill acquisition) in a specific sport situation (e.g. practice or competition; Martin et al., 1999).

**Applied model of imagery use in sport.** Given the limitations presented in Paivio's (1985) analytic framework, Martin et al. (1999) developed an applied model of imagery use in sport. The model was intended to guide athletes in terms of how they can implement imagery to achieve a specific outcome across diverse sport situations.

Borrowing from the triple code model of imagery (Ahsen, 1984), and Lang's (1979) bioinformational theory, the current model acknowledges that different images may present different meanings to athletes, which can then affect cognitive, affective and behavioral reactions. The key constructs of the model were developed through an extensive search of sport imagery research. As a result, four factors were identified: a) the sport situation, b) the type of imagery used, c) imagery ability, and d) outcomes of imagery use (Figure 2).

The center of the model consists of imagery types athletes may use consistent with those proposed by Paivio (1985) and extended by Hall et al. (1998; CS, CG, MS, MG-A, MG-M). The outcomes associated with these imagery types are presented in the model as: a) acquisition and improved skill and strategies, b) modification of cognitions and c) regulation of arousal and anxiety. Martin et al. (1999) suggest certain imagery types to be used for specific outcomes. For instance, CS imagery was found to be effective for improving a sit-up performance task (Lee, 1990), while MG-M images were used to improve self-efficacy (Moritz et al., 1996). Denis (1985) stated that for imagery to be most effective, its content must appropriately reflect the intended outcome.

The imagery types used may vary across sport situations such as: a) training, b) competition and c) rehabilitation. For instance, athletes may use CS imagery to improve a skill during training (Hall et al., 1998) and may use MG-M imagery prior to competition to reduce anxiety (Murphy, 1990). Lastly, the model indicates that one's ability to use visual and kinesthetic imagery can serve as a moderator for the relationship between imagery type and performance outcomes. Visual imagery involves seeing images despite the absence of external stimuli (Afremow, Overby, & Vadocz, 1997) and kinesthetic

imagery involves imaging sensations produced during movement execution (Afremow et al., 1997). The ability to use both visual and kinesthetic imagery varies between individuals, however it has been noted that greater performance outcomes are associated with the ability to use both modalities (Meyers, Cooke, Cullen, & Lies, 1979).

**The four W's framework.** In an effort to better understand athletes' use of imagery, Munroe, Giacobbi, Hall and Weinberg (2000) examined *where*, *when* and *why* athletes use imagery as well as *what* athletes image (4 W's). This qualitative approach allowed better insight to the images most important to athletes as opposed to the perspective of researchers and coaches. With respect to *where* athletes image, Munroe et al.'s results were consistent with previous research as such that athletes used imagery more during competition than in training. *When* athletes image was also consistent with previous findings as imaging just prior to competition was noted as the most pertinent time.

In terms of *why* athletes use imagery, Munroe et al. (2000) elaborated upon the five imagery types proposed by Paivio (1985) and Hall et al. (1998). In terms of CS imagery, Munroe et al. (2000) distinguished between skill execution and skill development, and further categorized skill development into technique and correction. CG imagery was further divided into strategy development (i.e., using imagery to rehearse strategies and routines) and strategy execution (i.e., using imagery to enhance strategies in training and competition). MS imagery was categorized into two types of goal related imagery; process (actions required to perform well) and outcome (performance result) imagery. Furthermore, outcome imagery was separated into a team and individual component. Prior to their study, previous research recognized the multiple

uses of MG-A imagery, however the specific components had yet to be identified. Munroe et al. (2000) found MG-A imagery to account for excitement, control and relaxation and MG-M imagery to account for mental toughness, focus, confidence and positivism.

**The revised applied model of deliberate imagery use.** The original applied model of imagery use in sport hypothesized that “what you see is really what you get” (Martin et al., 1999, p. 260). However, it has been argued that one imagery type can result in more than one outcome (Evans, Jones, & Mullen, 2004; Nordin & Cumming, 2008). Furthermore, Short, Monsma and Short (2004) argued that individuals interpret imaged content in different ways and may contain different meanings for different individuals. For these reasons, Cumming and Williams (2013) updated Martin et al.’s (1999) original applied model by developing the revised applied model of deliberate imagery use for sport, dance, exercise and rehabilitation. The model also expands upon Munroe et al.’s (2000) 4 W’s framework to include *who* is imaging and *how* an image is experienced. To address research findings introduced in the last decade, the revised model includes the following components: where and when, who, why, imagery meaning, what and how, imagery ability, and outcome<sup>1</sup> (Figure 3).

In terms of *where* and *when* athletes images, a number of locations have been reported including: at home, while travelling, or injured (Driediger, Hall, & Callow, 2006; Munroe et al., 2000). *Where* (e.g., location) and *when* (e.g., timeframe) one images are related to one another as athletes image more frequently during practice compared to before or after practice and will image more often just prior to performance than during or after performance (Munroe et al., 2000). The applied model suggests where and when

imagery occurs should be considered when designing imagery interventions or training programs (Cumming & Williams, 2013) as the imagery environment should closely match the actual performance environment (Holmes & Collins, 2001). The revised model also recognizes that the individual (*who*) can influence imagery use and its effectiveness. In sport, skill level influences imagery use as more accomplished athletes use imagery more frequently than their less accomplished counterparts (Cumming & Hall, 2002). Imagery experiences also influences an athlete's use of imagery, a concept known as "meta-imagery" (Moran, 2002). This is not only an understanding of the type of imagery that works best for the athlete, but also involves knowing when and how to maximize one's imagery experience (Moran, 2002).

A main concept of the model is the imagery function (*why*) that directly influences a desired outcome. The applied model distinguishes the term imagery function with imagery content as imagery function refers to the reasons why an individual uses imagery, whereas imagery content refers to what is being imaged (Murphy, Nordin, & Cumming, 2008). Imagery content can also serve different or multiple functions, especially when considering both the *who* and *where* elements as they are likely to influence the imagery content most effective for serving particular functions. For example, an athlete imaging performing a penalty kick may help to improve technique for one athlete and may be created to help reduce anxiety for another.

In terms of *meaning*, there is research to suggest that imagery is a highly personalized experience and can mean different things depending on the individual (Ahsen, 1984). The revised model highlights that the meaning behind an image is essential for determining what imagery content is most appropriate to create a certain

function. Personal meaning is presented in the model as a bridge between function and content and suggests imagery to be most effective when it is personal and meaningful to the athlete. Research by Wilson, Smith, Burden and Holmes (2010) suggest athletes who help generate their own imagery script have higher self-ratings of imagery ability compared to imagery scripts created by the researcher. In terms of *what* (type) and *how*, the revised model targets deliberate imagery, meaning intentionally using imagery to achieve a certain outcome or outcomes (Cumming & Williams, 2013). The model suggests that for imagery to be most effective, images should be consciously formed. The reasons for why an individual is imaging and the content of their images should also be considered. For this reason, the content of an imagery intervention should be established prior to determining what functions it should serve (Williams & Cumming, 2013).

Similar to the original model of imagery use in sport (Martin et al., 1999), the revised model suggests that *imagery ability* influences the degree of effectiveness for achieving desired outcomes. Imagery ability is defined as “an individual’s capability to form vivid, controllable images and retain them for sufficient time to effect the desired imagery rehearsal” (Morris, 1997, p. 37). A study conducted by Robin, Dominique, Toussaint, Blandin, Guillot, and Le Her (2007) found all participants to improve their tennis service return accuracy following the use of imagery combined with physical practice. However, those who had higher imagery ability showed the most improvement. Such findings suggest that individuals with greater imagery ability experience greater performance outcomes. Within the revised model, imagery ability directly influences *what* is imaged and *how*. This is based on research conducted by Williams and Cumming (2012) who report individuals to select imagery and characteristics that are easy to

generate and sustain. Imagery ability can also indirectly affect the desired outcome; therefore in this model, imagery ability serves as both a mediator and moderator for the relationship between imagery use and the desired outcome.

Lastly, imagery outcomes are those achieved through imagery functions and may be intentional or unintentional. Therefore, an athlete may experience outcomes not initially intended. Guillot and Collett (2008) suggest four outcome categories: motor learning and performance, strategies and problem solving, psychological outcomes (e.g., attention, arousal, anxiety, motivation) and injury rehabilitation (e.g. healing, flexibility, pain management). Athletes should be cautious of using inappropriate or incorrect imagery as it can result in negative outcomes or no outcome at all (Nordin & Cumming, 2005).

### **Sport Imagery Measures**

The first imagery questionnaire pertaining to sport was developed by Salmon, Hall and Haslam (1994) titled Imagery Use Questionnaire for Soccer Players (IUQ-SP). The questionnaire assessed the five imagery types from Paivio's (1985) analytic framework, later expanded upon by Hall et al. (1998). Although adequate internal consistency, the IUQ-SP was limiting as it was sport specific, relating only to soccer players. Due to this limitation, Hall et al. (1998) developed the Sport Imagery Questionnaire (SIQ) to assess the frequency of the five imagery types across various sports.

As a result, 30 items were developed to reflect the five types of imagery (CS, CG, MS, MG-A, MG-M) used with adult athletes. To assess imagery frequency, items are scored on a 7- point Likert scale ranging from 1=*rarely use that type of imagery* to 7=

*often use that type of imagery.* An example item used for the CS subscale includes: “I can easily change an image of a skill” whereas “I make up new plans/strategies in my head” is used to represent the CG subscale. In regards to MS, an example item includes: “I imagine the audience applauding my performance.” An example of an MG-A item includes “I imagine the excitement associated with competing” whereas an example of an MG-M item used is “I image myself being in control in difficult situations.” All five subscales show internal consistency with alpha values ranging from 0.70-0.88 (Hall et al., 1998). The use of motivational imagery by athletes more often than cognitive imagery (Hall et al., 1998), align with previous research by Salmon et al. (1994). Further, imagery use was found as a predictor of successful performance, proving the predictive validity of the questionnaire (Hall et al., 1998). Due to its overall validity and reliability, the SIQ has been the measure most used in adult athlete imagery research (Morris et al., 2005).

### **Imagery Use by Young Athletes**

Although early sport imagery research has mainly focused on adult athletes, there has been a surge of studies that have examined imagery use with young athletes. Using the same methods as previously used in the 4 W's of adult athletes' imagery use (Munroe et al., 2000; where, when, what why), Munroe-Chandler et al. (2007) qualitatively examined youth athletes' imagery use to determine similarities and differences with adults athletes' use of imagery as well as any developmental and gender differences across age cohorts. Athletes 7-14 years of age were recruited as this age range aligns with those from Piaget's stages of cognitive development. Children were divided into four age cohorts (7-8, 9-10, 11-12, 13-14). Focus groups were conducted using an interview guide approach (Patton, 1990) to allow inclusion or exclusion of any ideas that may emerge.

In terms of *where* and *when* young athletes use imagery, all age cohorts regardless of gender reported using imagery during practice as well as before and during competition. In addition, the three older age cohorts (9-14 years of age) described using imagery outside of practice as well as post-competition. It is suggested that these findings may be due to the fact that young athletes (7-8 years of age) are sampling various sports, limiting the amount of time available to focus on one particular sport (Munroe et al., 2007). As to *why* athletes use imagery, all five types of imagery (i.e., cognitive and motivational purposes) were reported by all age cohorts, but to a different extent than adults. During focus groups, athletes most often reported using cognitive imagery (CS, CG) as children in this age range are continuously learning new skills and strategies (Munroe et al., 2007). All age groups reported using imagery for motivational purposes, however the younger age cohort (7-8 years) reported using MG-M and MG-A to a lesser degree than their older counterparts. More competitive opportunities for older age cohorts to experience high anxiety levels is one possible explanation for this finding (Munroe et al., 2007).

When examining gender differences, Munroe-Chandler et al. (2007) found all females, regardless of age, to use MG-A imagery; a finding not replicated with males. Munroe-Chandler et al. (2007) suggested such findings may be influenced by social desirability as male athletes may have avoided discussing their performance anxiety in front of their peers. It is also suggested that the sample of sports involved in this study may have influenced such findings. Most participants in the study participated in sports common for female athletes (e.g., gymnastics, dance) which may have evoked higher

levels of arousal and anxiety due to the individual and judged nature of the sport when compared to sports common for males (volleyball, soccer).

Gender differences were also reported in regards to MG-M imagery. Except for the 9-10 female cohort, MG-M imagery was used by all other female cohorts to improve self-confidence. However, the 9-10 and 13-14 male cohorts did not report using imagery for this purpose. Munroe et al. (2007) discussed socialization as a potential suggestion for such findings as research shows boys' perceived ability to be greater than girls once they reach first grade (Greendorfer, Lewko, & Rosengren, 1996). Given mental toughness is a characteristic of male-dominance, male athletes may have refrained from reporting the use of MG-M imagery to avoid perceptions of weakness (Munroe-Chandler et al., 2007). Overall, the qualitative study revealed several gender differences in athletes' imagery use as well as provided insight to the development of imagery use as athletes move from childhood to adolescence (Munroe-Chandler et al., 2007).

In an early imagery intervention study, Munroe-Chandler, Hall, Fishburne and Shannon (2005) sought to determine the effect of CG imagery (imaging strategies, game plans, and routines) with a youth female elite soccer team (13 years and under). Three strategies were chosen for this study: a strategy to defend against a direct free kick, a strategy to create a goal scoring opportunity when taking a direct free kick, and a strategy to defend against a corner kick. CG, CS, and MG-A imagery significantly increased from baseline to post-intervention. Although the CG imagery intervention was not shown to enhance the team's soccer strategies, young athletes' use of imagery did increase over the course of the study which was most likely due to the imagery intervention. Similarly, Munroe-Chandler and Hall (2005) conducted a 13-week intervention study to investigate

the effects of MG-M imagery on the collective efficacy of a female soccer team (10-12 years of age). Imagery scripts were created for each position: forward, midfield and defense/goalkeeper, each starting at a different time period throughout the intervention. In addition to using imagery more often each day, collective efficacy increased with the implementation of the MG-M intervention during both training and competition with both forwards and midfielders. Evidently, applied imagery studies show the impact of imagery on young athletes' sport performance.

**Sport imagery measure for young athletes.** The early sport imagery literature clearly demonstrated that young athletes used imagery for both cognitive and motivational reasons, however a valid and reliable measurement tool was warranted to further examine this concept. Although the SIQ (Hall et al., 1998) had already been developed to assess imagery use in adult athletes, administering an adult questionnaire to a youth sample was problematic as understanding the concepts and terminology would be difficult (Stadulis, MacCracken, Edison, & Severance, 2002). Munroe-Chandler et al.'s (2007) qualitative study provided a foundation for the basis of a child-specific questionnaire resulting in the adaption of the SIQ to form the Sport Imagery Questionnaire for Children (SIQ-C; Hall, Munroe-Chandler, Fishburne, & Hall, 2009). After undergoing three experimental phases, 21-items emerged consisting of five subscales (CS, CG, MS, MG-M, MG-A) for which participants responded on a five-point Likert scale (*1=not at all, 5= very often*). An example item for CS imagery includes: "When I think of doing a skill, I see myself doing it perfectly", whereas one of the CG item includes: "I make up new game plans or routines in my head." In terms of motivational imagery, an example of an MS item is "I imagine other people telling me

that I did a good job.” An example item for MG-M includes “I imagine myself being confident in competition” whereas MG-A includes “I imagine myself staying calm in competitions.” Adequate internal consistencies for most subscales were found, however the CG and MG-A subscales reported alpha values slightly lower than recommended (.70; Nunnally, 1978). In support of Munroe-Chandler et al.’s (2007) study, youth athletes (7-14 years) reported using all five types of imagery, similar to adults. However, contrary to the gender differences reported by Munroe-Chandler et al. (2007), the current study reported imagery use similar for both males and females. Overall, the SIQ-C provides adequate structural validity and allows for assessment of cognitive and motivational imagery functions with athletes 7-14 years of age (Hall et al., 2009).

### **Dance Imagery**

Imagery serves many benefits in the dance domain (e.g., set goals, improve self-confidence, prepare for performance) and can be gained through proper imagery training (Calmels, D’Arripe-Longueville, Fournier, & Soulard, 2003). Given most of the dance imagery research has been conducted with ballet dancers (e.g., Fish, Hall, Cumming, 2004; Heiland & Rovetti, 2013; Monsma & Overby, 2004; Nordin-Bates, Cumming, Aways, & Sharp, 2011), it is possible that other dance styles may use imagery differently. Although only one study has examined the differences of imagery use among ballet and contemporary dancers (Nordin-Bates, Cumming, Ways, & Sharp, 2011), findings from the sport domain (Munroe, Hall, & Simms, 1998) report the use of cognitive and motivational types of imagery to be influenced by sport type. Future research in this area is warranted for dancers. The following section provides an overview of the dance imagery literature. Various models, which provide guidelines for effective imagery use,

as well as a measurement tool developed specifically for the dance population are discussed. Finally, research pertaining to where, when, what, why and how dancers are imaging is highlighted.

### **Dance Imagery Models**

**PETTLEP Model.** Although the PETTTLEP model was developed for the sport domain (Holmes & Collins, 2001), such guidelines can be effective when developing imagery scripts for dancers (Pavlik & Nordin-Bates, 2016). The model provides guidelines for practitioners to consider when writing an imagery script and includes seven elements: Physical, Environment, Task, Timing, Learning, Emotion, and Perspective to create images that closely resemble reality (Holmes & Collins, 2001). The *physical* component involves moving or holding a sport/dance element during the imagery process. For example, a dancer may use their skirt while imaging as if using the skirt during actual performance. The *environment* is the second component of the model and pertains to where the activity will take place. For example, a dancer may image in the same room his/her audition will take place. The model suggests all five senses to be incorporated in the script to fully depict the real environment. Third, the *task* component involves imaging the tasks associated with physical performance and is recommended for imagery interventions to focus on the thoughts, feelings, and events involved during actual performance (Holmes & Collins, 2001). For example, a dancer may image performing an arabesque movement during actual performance. *Timing* is the fourth element and refers to the temporal characteristics of the imaged skill. According to Holmes and Collins, imagery is most effective when it is implemented to match the actual movement time, especially when timing is fundamental to the task. For example, a

dancer may image the actual tempo and rhythm of a performance routine. In terms of the *learning* component, imagery content must be reviewed regularly as our memory representations change over time as a result of learning and practice. *Emotions* should also be taken into consideration when creating imagery scripts as imaging inappropriate emotions can be debilitating to performance. Images should reflect appropriate emotions for the given task to ensure they are experienced during the real-life experience. For example, a dancer may image feeling calm and graceful when imaging a routine in which he/she plays the role of a swan. *Perspective* is the last component of the PETTLEP model and incorporates both internal and external imagery perspectives. An internal perspective involves a dancer executing a movement through his/her own eyes (Afremow et al., 1997). For example, a dancer may imagine themselves standing on stage with the audience in front of them. Alternatively, an external perspective involves viewing an image from someone else's point of view. For example, a dancer may imagine themselves performing a routine as if watching themselves on television. Hall, Rodgers and Barr (1990) encourage athletes and dancers to use kinesthetic imagery regardless of visual perspective.

### **Dance Imagery Measure**

**The Dance Imagery Questionnaire.** Although the SIQ (Hall et al., 1998) has demonstrated good validity and internal reliability in the sport domain, it has been shown to be problematic for dancers. Fish et al. (2004) and Monsma and Overby (2004) investigated imagery use with ballet dancers by amending the wording of the items in the SIQ as no dance specific measurement existed at the time. Overall, both studies found ballet dancers to engage in all five imagery types, similar to athletes. However, both

studies found problems in terms of internal reliability with both the CG and MG-A subscales, suggesting the applicability of the SIQ in a dance setting. More recent researchers, however, found that dancers engage in imagery types beyond those used in sport. Nordin and Cumming (2005a) qualitatively investigated professional dancers and their imagery use and confirmed that dancers use both cognitive and motivational imagery, as identified in the sport literature, as well as types related specifically to a dance setting (e.g., execution, body-related, character and roles).

A dance specific imagery measure was needed to adequately capture all imagery types used by dancers. The Dance Imagery Questionnaire (DIQ; Nordin & Cumming, 2006a) measures the frequency of various imagery types engaged in by dancers. Previous qualitative findings (Nordin & Cumming, 2005a) provided the foundation for the development of the DIQ items. After undertaking three studies to determine the structural validity, test-retest reliability and concurrent validity of the questionnaire, a total of 16 items were included. Nordin and Cumming (2006a) found dancers to engage in four imagery types: technique, goals, role and movement quality and mastery. Technique imagery describes the mental rehearsal of movements or sequences (similar to CS and CG imagery). An example item for this subscale includes, "I image specific skills (e.g., a jump, a pirouette) being performed perfectly." Goal imagery encompasses striving to achieve a dance-related goal. An example item for this subscale includes, "I imagine myself working hard to reach my goals in dance." The third subscale is role and movement quality imagery which involves character and roles as well as metaphorical/indirect imagery containing objects that are not actually present in order to improve a specific movement (Overby, 1990). An example item for this subscale

includes, “I image taking on the characteristics of something else (e.g., arm is a wing on a bird, spin like a spinning top).” Lastly, mastery imagery is related to controlling anxiety, planning and remaining focused (similar to MG-M and MG-A imagery). An item for this subscale includes, “I imagine myself being psyched up.” Satisfactory internal reliabilities were reported for all four subscales with alpha values ranging from 0.77-0.82 (Nordin & Cumming, 2006a). Overall, the DIQ is a valid and reliable questionnaire that can be used with dancers of various levels (beginners to professionals).

### **Imagery Use by Adult Dancers**

Most of the dance imagery literature has been examined based on Munroe et al.’s (2000) 4 W’s framework: where, when, why and what, as well as the Revised Applied Model of Imagery (Cumming & Williams, 2013), which includes *who* is imaging and *how* an image is experienced. Therefore, the subsequent dance imagery literature will be divided into six subheadings: *Who*, *what*, *where*, *when*, *why* and *how*.

**Who.** Generally, dancers from various levels and styles use imagery (Pavlik & Nordin-Bates, 2016). Given dance settings typically have a higher proportion of female than male dancers (Adair, 1992), literature comparing gender differences in terms of imagery is limiting. Nonetheless, research in the sport and exercise domains indicate that males and females rarely differ in their imagery (Hall, 2001). In terms of imagery frequency, numerous studies have reported experienced dancers to image more frequently than their novice counterparts, regardless of imagery type (Monsma & Overby, 2004; Nordin & Cumming, 2006a; Nordin & Cumming, 2008;). This may be due to the amount of time the dancer has been dancing as those who have danced longer may use imagery more frequently (Pavlik & Nordin-Bates, 2016). In addition, dancers have reported their

imagery to improve over time in terms of complexity and control (Nordin & Cumming, 2005b) and have shown to layer their images more often (Nordin & Cumming, 2007). For instance, when performing a pirouette, the dancer may begin with imaging the technical components to perfect the movement and then may add a second layer of images involving movement quality and control.

Dance teachers have also reported using imagery and are considered to play a critical role in their student's imagery process (Nordin & Cumming, 2006b). When compared to sport, dance teachers use more kinesthetic imagery during training and implement imagery for the purpose of enhancing their student's technique and creativity (Overby et al., 1998). Overall, it seems dance teachers use imagery more extensively compared to sport coaches (Pavlik & Nordin-Bates, 2016). Dance teachers use imagery both prior to teaching (e.g., planning) and during teaching to bring attention to a movement or describe the execution of a step (Nordin & Cumming, 2005a). Teachers' use of imagery is also influenced by the experience level of the class. As the experience level increases, the complexity and frequency of the images presented by teachers also increases (Nordin & Cumming, 2006b; Nordin & Cumming, 2007). In recent research, more experienced dancers felt encouraged by their teachers to use imagery and were recommended to incorporate imagery into their practice routine (Nordin & Cumming, 2006b).

**What.** *What* dancers are imaging is represented by the four imagery types resulting from the DIQ (technique, goals, role and movement quality and mastery; Nordin & Cumming, 2006a). In terms of imagery frequency, technique imagery is used most often by dancers, while mastery imagery is used the least (Nordin & Cumming, 2006a;

2008). Such findings contradict those in the sport domain which have consistently found athletes to engage in mastery-type imagery compared to the other sport imagery types (Abma et al., 2002; Gregg et al., 2005; Hall et al., 1998). Mastery imagery (MG-M) in sport is similar to that of dance as it consists of imaging oneself being confident, mentally tough and in control (Hall et al., 1998). Given the dance domain requires the use of mastery imagery similar to that of sport, the underutilization of this imagery type by dancers is of potential concern. However, Pavlik and Nordin-Bates (2016) suggest dancers may not use mastery imagery to a lesser degree than athletes but rather image the accompanying types more often.

Despite the potential concern, dance imagery research has examined the effect of mastery imagery with dancers (Fish et al., 2004; Monsma & Overby, 2004). Audition anxiety and imagery use among auditioning ballet dancers has been examined (Monsma & Overby, 2004). Dancers who were confident in their ability to perform were better able to use kinesthetic imagery, used more mastery imagery and less imagery associated with arousal when compared to less confident dancers (Monsma & Overby, 2004). The authors encouraged future researchers and dance teachers to incorporate mastery imagery to increase confidence and lower anxiety. Similar results were found by Fish et al. (2004) in their examination of imagery use with professional ballet dancers wherein they found mastery imagery to be a significant predictor of self-confidence. More recently, Nordin and Cumming (2008) compared the imagery of dancers and aesthetic performers. Aesthetic performances not only involve athleticism but also incorporate an artistic component (Nordin & Cumming, 2008) and may include figure skaters, gymnasts, cheerleaders and synchronized swimmers. The DIQ was administered to dancers and the

SIQ was administered to aesthetic performers. The DIQ predicted additional variance outside of that offered by the SIQ, suggesting the potential suitability of the DIQ for aesthetic performers (Nordin & Cumming, 2008).

**Where.** In terms of *where* dancers image, Nordin and Cumming (2005a) conducted a qualitative study to examine dancers' use of imagery. According to their results, *where* dancers engage in imagery are presented under four categories: at home, in dance settings, in other places, and anywhere/wherever. Of the 15 dancers interviewed, 11 reported using imagery at home as it allowed them to be comfortable and free from distractions. Thirteen dancers reported using imagery in dance settings such as the change room, the studio, in the wings prior to going on stage and on stage. Ten dancers reported using imagery in quiet places, while transporting (e.g., car or train), as well as places where movement was not possible. Although dancers stated that imagery can be used anywhere or wherever, imaging in the studio and at home were reported as most effective (Nordin & Cumming, 2005a). Similar results were found in a more recent study conducted by Nordin and Cumming (2007) wherein dancers reported imaging at home, in the dance context (e.g., studio, by the stage) as well as in "other" places.

**When.** Researchers report imagery to be implemented by dancers during rehearsal and performance, as well as before, during and after class (Hanrahan & Vergeer, 2000; Nordin & Cumming, 2005a), however the content (what) and purpose (why) varies. According to Hanrahan and Vergeer (2000), while waiting to go on stage, dancers formed images associated with mood to elicit the proper mood for performance. Nordin and Cumming (2005a) reported dancers to form images of movement execution just prior to performance and incorporated metaphorical images during actual movement.

In regards to practice, imagery is used as a replacement of physical movement when dancers feel fatigued, seek a creative tool, or require an aid to learn and remember steps (Nordin & Cumming, 2005a). Dancers also use imagery outside of practice and performance as a technique to evaluate and supplement physical practice (Nordin & Cumming, 2005a).

In terms of frequency, dancers use imagery often prior to initiating a movement, preferably in a relaxation pose or a quiet stance (Gamboin, Chatfield, & Woollacott, 2000; Goldschmidt, 2002; Overby & Dunn, 2011). During this time, dancers image with the mind as opposed to incorporating the image into movement. Researchers also found dancers to use imagery frequently while dancing, employing one or several of the four imagery types previously discussed (Girón, McIssac, & Nelson, 2012; Hanrahan & Vergeer, 2000; Nordin & Cumming, 2005a; Nordin & Cumming, 2007). During this time, the mind and the body are imaging in unison. Pavlik and Nordin-Bates (2016) state that such timing of imagery is what separates dancers from other physical activities. Athletes most often use imagery in a static position or with minimal gestures, while dancers use imagery in both static and dynamic conditions (Vergeer & Hanrahan, 1998). When surveying dancers, May et al. (2011) found dancers to dislike using imagery while being still as it seems counterintuitive and diminishes the effects of the previous warm up, suggesting imaging while dancing to be a fundamental part of their performance routine.

**Why.** Dancers use imagery for various reasons and implement an image often for more than one reason. Dancers frequently report using imagery for the purpose of enhancing their movement (Hanrahan & Vergeer, 2000; Nordin & Cumming, 2005a;

Vergeer & Hanrahan, 1998). For example, a dancer may image themselves being as tall as a tree in order to help improve his/her posture. In addition to improving movement, dancers also use imagery to help reduce anxiety (Fish et al., 2004), enhance self-confidence (Fish et al., 2004; Monsma & Overby, 2004) and remain positive during difficult situations (Fish et al., 2004; Nordin & Cumming, 2005a). Mastery type imagery can allow dancers to stay focused and increase their motivational drive. Dancers also report using imagery for artistic reasons such as to seek inspiration, to develop character/roles and to communicate with the audience (Nordin & Cumming, 2005a). In addition to performance purposes, dancers also use imagery for healing reasons for the purpose of rejuvenation and revitalization after being injured (Nordin & Cumming, 2005a). In this situation, a dancer may use anatomical images to help manage the pain associated with an injury.

Similar to dancers, teachers consistently use imagery for movement enhancement (Krasnow, 1997), clarifying movement, or expressing thoughts and feelings related to a movement (Nordin & Cumming, 2005a). Ideokinesiology is a somatic technique which involves using imagery for the purpose of improving skeletal alignment and posture by re-patterning neuromuscular pathways in the absence of overt movement (Fairweather & Sidaway, 1993). Such images are recommended for use by teachers with dancers at all levels (Golomer, Mertz, Bouillette, & Keller, 2008). In regards to young dancers, Nordin and Cumming (2006b) found teachers to provide more metaphorical images, as opposed to technique images, as a way to enhance understanding and quality of movements, while maintaining enjoyment and interest.

**How.** In terms of *how* dancers image, images can be created with the use of sensory modalities. Dancers report using their visual (sight), auditory (sound), olfactory (smell), tactile (touch) and kinesthetic (feel) senses while imaging (Afremow et al., 1997; Nordin & Cumming, 2005a; Vergeer & Hanrahan, 1998). Both kinesthetic and visual senses are the most commonly used modality by dancers with the other senses used to a lesser extent (Hanrahan & Vergeer, 2000; Nordin & Cumming, 2005a; Vergeer & Hanrahan, 1998). Kinesthetic imagery involves imaging sensations produced during movement execution (Afremow et al., 1997) and is suggested to be the most effective modality for improving movement skills (Franklin 2013). Visual imagery involves seeing images despite the absence of external stimuli (Afremow et al., 1997) and can be distinguished in terms of an internal and external perspective previously discussed in the PETTLEP model. Vergeer and Hanrahan (1998) examined the pre-performance routines of modern dancers in which participants reported to use both internal and external perspectives in order to compare their movement experience to what an observer might see. Pavlik and Nordin-Bates (2016) suggest further insight is needed as to which perspective would best result in a desired outcome.

Dancers' images may also be a result of an external stimulus or a memory (e.g., picture, experience, or a song; Nordin & Cumming, 2005). A study conducted by Olshansky, Bar, Fogarty and DeSouza (2015) investigated various musical pieces and its effects on imagery with an experienced break-dancer. Results showed intricate and elaborate images to be associated with the dancer's familiarity with the music. Such results suggest that the movement itself can trigger the creation of an image (Hanrahan & Vergeer, 2000). Teachers also create images for their students during class. It is

recommended that teachers pre-plan their images and implement them in an organized manner (Afremow et al., 1997; Vaccaro, 1997). Hanrahan (1985) recommends that images should encompass personal meaning for the imager, corresponding with Cumming and Williams (2013), as they state the feelings of the person imaging must be considered in order for the desired outcome to be achieved. Hanrahan (1995) emphasizes imagery scripts to be modified to the target audience, inspire desired emotions, target the desired movement, and consist of a clear goal.

Imagery ability also plays an important role in how dancers image. Imagery ability refers to the ease with which dancers can visually and kinesthetically image (Nordin & Cumming, 2006b). According to Cumming and Williams (2013), imagery ability influences the extent to which imagery is used effectively for achieving a desired outcome. Mixed findings have been found in terms of which imagery ability (visual vs. kinesthetic) dancers are better able to perform. Nordin and Cumming (2006b) found dancers to have greater visual imagery ability than kinesthetic imagery. Alternatively, Golomer et al. (2008) found half of the dancers in their study had higher visual imagery ability while the other half possessed both visual and kinesthetic ability equally. Further, researchers have found those who scored high on an imagery ability measure preferred to learn through “feeling” (Bolles & Chatfield, 2009), and that experienced dancers showed higher imagery abilities in terms of cognitive, spatial and body imagery than their novice counterparts (Overby, 1990). It was suggested that experienced dancers have a greater ability to image due to their years of experience (Overby, 1990). Imagery ability can be increased through interventions (Williams, Cooley, & Cumming, 2013) and can improve

the complexity, structure and controllability as dancers progress (Nordin & Cumming, 2006b).

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## ENDNOTE

1. Given this section of the review focuses on the sport domain, the following descriptions and examples of each component of the model will be related to athletes. In regards to the application of the models with dancers, refer to the dance imagery section pertaining to adult research.

## FIGURES

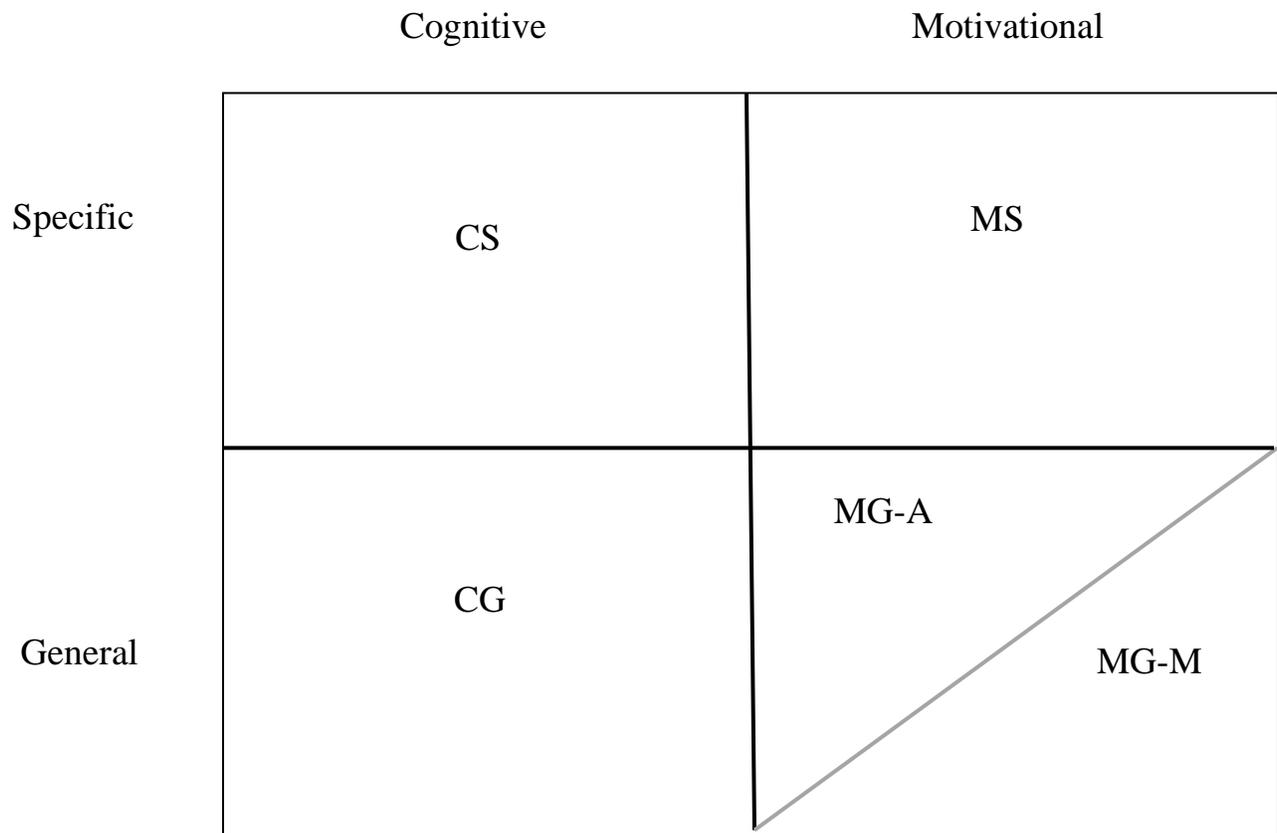


Figure 6. Revised analytic framework of imagery effects. Adapted from “Imagery use by athletes: Development of the Sport Imagery Questionnaire” by C. R. Hall, D. E. Mack, A. Paivio, & H. A. Hausenblas (1998), *International Journal of Sport Psychology*, 29, p. 74.

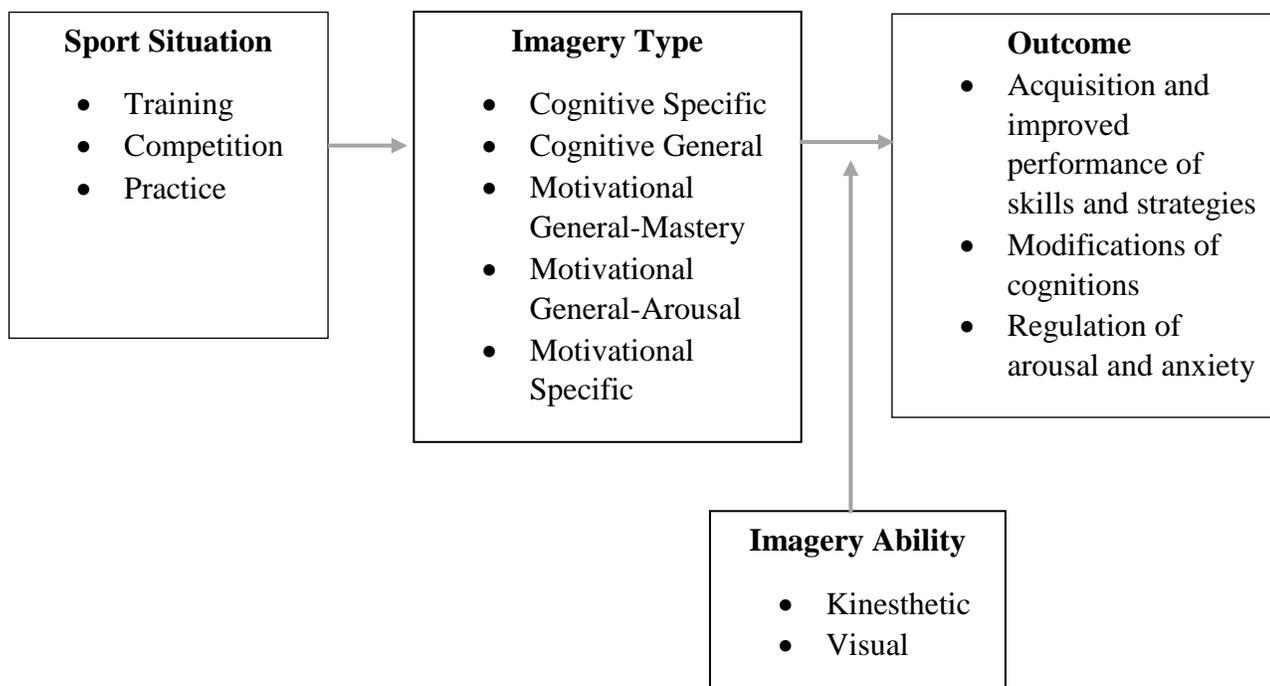


Figure 7. An applied model of imagery use in sport. Adapted from “Imagery use in sport: A literature review and applied model,” by K. A. Martin, S. E. Mortiz, and C. R. Hall, *The Sport Psychologist*, 13, p.248

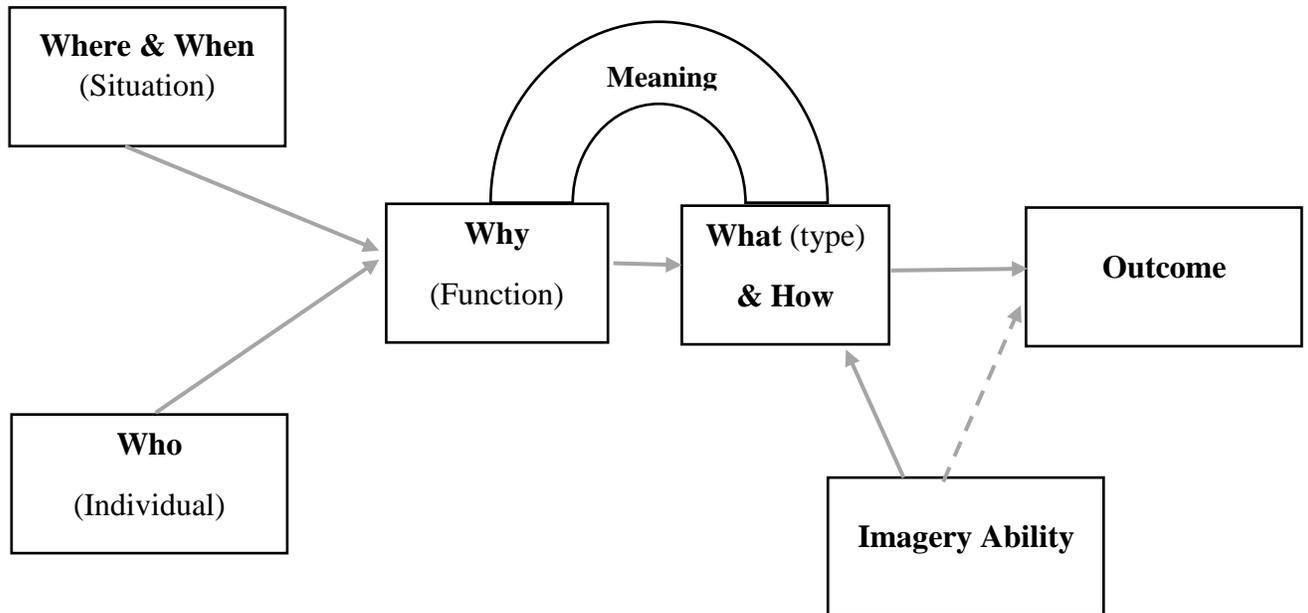


Figure 8. Revised applied model of deliberate imagery use. Adapted from “Introducing the revised model of deliberate imagery use for sport, dance, exercise, and rehabilitation” by J. Cumming, & S. E. Williams (2013), *Movement & Sport Sciences*, 82, p. 71.

## APPENDICES

## APPENDIX A

## Interview Guide

**Imagery Use with Young Female Dancers****Interview Guide****1. Welcome:**

- a. Thank you for taking the time to join the discussion group on imagery use in a dance. My name is \_\_\_\_\_. Assisting me is \_\_\_\_\_.

**2. Guidelines:**

- a. Before we begin, let me suggest some ways to help the discussion go smoothly. You will be audio-recorded because we don't want to miss any of your comments. Be sure to speak loud and clear enough for everyone to hear. Please only speak one at a time as all of your comments are important to us. Your first names will be used here today, but in a report that we write after collecting our data, your names will not be used so that no one will know which comments were made by who.
- b. My role is to ask questions and listen to your comments. I won't be participating in the conversation, but I want you to feel free to speak with one another. I will be asking about 6-8 questions and I will be moving the discussion from one question to the next. We will be done in about 45 minutes. It is important that I hear from each of you because you all have different experiences dancing in your specific style. So if one of you is sharing a lot, I may ask if others have something to share as well. And if you aren't

saying too much, I may ask if you have something to add. We've placed name cards on the table in front of you to help us remember each other's names.

3. **Getting to Know You:** (approx. 5 minutes)

- a. Let's find out some more about each of you by going around the table. Please state your name, age, style of dance, and your most memorable moment in dance. (Each person needs to respond)

4. **Overview of the Topic:**

- a. We want to hear how you use imagery in dance.
- b. Definition: Dance imagery is a skill that is done in our head using our five senses to practice or picture a movement or several movements in dance. We can use imagery on its own or while we are dancing. The images you form in your head can be made up of a real movement or objects, situations and movements that do not actually exist
- c. You were selected to join our discussion group because you are all female dancers.
- d. Today we will be discussing what you picture in your mind while you are dancing or in a dance setting. I'll be asking questions such as where, when, why and what you image in dance.

5. **Introductory Questions:**

- a. **Imagery Description:** How would you describe imagery?

Probe: What are some other terms used in place of imagery?

Probe: Give a dance specific example (i.e., performing a pirouette movement, seeing yourself performing on stage in front of an audience)

6. **Key Questions:**

- a. **Overall Imagery use:** In a dance setting, what images do you form in your mind that relates to dance?

Probe: Can you describe how often you create these images?

Probe: How long do you usually image for?

- b. **Content of Imagery:** When you create these images in your mind, what images are you thinking of?

Probe: Describe what you image before, during and after competition.

Probe: When practicing a routine, what do you image?

Probe: Describe what you image when trying to perfect a movement.

Probe: When different qualities are required for a role or routine (e.g. being calm and graceful), what do you image?

Probe: When dealing with difficulties in dance, what do you image?

Probe: Describe what you image when setting goals for dance.

Probe: When experiencing nerves (if any) in dance, what do you image?

Probe: Do you imagine yourself as if you are on tv or is it through your own eyes?

Probe: Do you image at a fast or slow speed? Or at the same time as you actually dance?

Probe: Has your imagery changed over the course of dancing in your specific style?

- c. **Why Imagery is used:** What is the reason you create these images?

Probe: Describe any positives or negatives (if any) you think creating these images had; these can be mental or physical.

Probe: Has the purpose of your imagery always been the same? Or has it changed as you continued dancing? If it did change, in what way did it change?

d. **When Imagery is used:**

Probe: Tell me about when you think the best time for you to use imagery is.

Probe: Why do you think this was the best time for you?

e. **Where Imagery is used:** In what setting do you use imagery for dance?

(Home, dance studio, home, etc.)

Probe: What setting do you find to be the most effective in using dance related imagery?

Probe: Why do you think this is the best setting for you?

f. **Final Thoughts:** Is there anything that we have discussed today that you would like to expand on or talk more about?

g. **Summary:**

- a. Summarize the most important findings (refer to assistant). Capture common themes but acknowledge different points of view.

Probe: Is there anything that we should have talked about and didn't?

Did we miss anything?

## APPENDIX B

## Parent/Guardian Letter of Information

**Parent/Guardian Letter of Information**

Title of Study: **The 4 W's of Young Female Dancers' Use of Imagery: Where, When, Why and What**

Your child is asked to participate in a research study conducted by Ms. Irene Muir, a Master's student from the Faculty of Human Kinetics at the University of Windsor. Young female dancers' use of imagery will be investigated. The results of this research will contribute to Ms. Muir's Master's Thesis. If you have any questions or concerns about the research, please feel free to contact Ms. Irene Muir at (519)-253-3000 (x4058) [mui@uwindsor.ca](mailto:mui@uwindsor.ca) or her advisor Dr. Krista Chandler at (519)-253-3000 (x2446), [chandler@uwindsor.ca](mailto:chandler@uwindsor.ca).

**PURPOSE OF THE STUDY**

This study is designed to qualitatively assess where, when, why and what young female dancers are imaging.

**PROCEDURES**

If you volunteer your child to participate in this study, she will be asked to:

**a) Participate in a focus group**

Participants will take part in one short (45-60 min) focus group at the University of Windsor Human Kinetics Building, which will consist of 6-8 other female dancers of around the same age in each focus group.

- a) A moderator, with the help of a technical assistant, will lead the focus group. The technical assistant will be responsible for audio recording the sessions as well as keeping accurate field notes. Audio recording is necessary in order to capture all discussion with respect to imagery use.
- b) We will begin by asking questions regarding the dancers' use of imagery, where they use it, when they use it, why they use it, and the content of their images while dancing or in a dance setting. Specific probes will be used in order to gain a greater understanding around ideas emerging from focus groups.

**b) Be audio recorded**

Each focus group will be audio recorded to capture all participants' responses. Audio recording is voluntary, and your child is free to excuse themselves from the discussion at any time. If your child does not wish to be recorded, they will not be

part of the study. Your child's name will not be revealed to anyone, as only the researchers will have access to the recordings. Audio files will be in a locked cabinet in the lead researcher's office. The audio files are for research use only. The audio files will be appropriately disposed of after the study is completed.

### **POTENTIAL RISKS AND DISCOMFORTS**

There are no known or anticipated risks from discussing imagery use in dance.

### **POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY**

Each participant will receive a take home sheet of the best practice on imagery use after the focus groups have been conducted. Participants may gain a better understanding of the types of imagery used in dance. There is currently no established research examining young dancers' use of imagery and therefore results from the proposed study may further contribute to the scientific literature.

### **COMPENSATION FOR PARTICIPATION**

All participants will be entered into a draw to win one of two \$50 gift certificates to Motions 1.

### **CONFIDENTIALITY**

The focus group is a group event. All members of the group will be asked to keep the information they hear confidential. However, this means that while confidentiality of all the information given by the participants will be protected by the researchers themselves, this information will be heard by all the participants and therefore will not be strictly confidential. During the data collection phase, all participant data will be kept in a locked cabinet, to which only the listed investigators have access. After five years, all hard copies of the data will be destroyed and audio files erased. Each participant has the right to review the audio files and may request to have their section of the files edited by the researcher. Once the data collection phase is complete, each participant will be assigned a participant number and participant's data, identified only by participant number, will be entered into a qualitative analysis program. The resulting data set will be password-protected to ensure that only the listed investigators are able to access the data. In release of the findings, the results will be referred to only by a participant number, and thus, it will not be possible to identify or link any results to any one specific participant.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.

### **PARTICIPATION AND WITHDRAWAL**

The participant's right to withdraw from this study is addressed in the Assent form and in the Parent/Guardian Letter of Information. Participants will be informed that if they volunteer to participate in this study they can withdraw at any time without penalty. Parents/Guardians can also remove their child and their child's data from the study at any point without penalty. All participants who complete the focus group regardless of whether the participant withdraws from the study at a later date will be entered into the draw. The children may refuse to answer any questions that they choose and will still remain a participant in the study. However, it should be noted that participants must complete the focus group in order to be entered into the draw. If a participant withdraws

before completion of the focus group, he/she will not be entered into the draw. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

#### **FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS**

The investigator will provide a written summary of the study's findings to you upon request. The results will also be posted on the REB website at <http://www1.uwindsor.ca/reb/study-results>. If you have any additional concerns or questions you can email or call the investigator(s) at the address or number provided above. Please keep this Letter of Information.

#### **SUBSEQUENT USE OF DATA**

These data will not be used in subsequent publications and in presentations.

#### **RIGHTS OF RESEARCH PARTICIPANTS**

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: [ethics@uwindsor.ca](mailto:ethics@uwindsor.ca)

#### **SIGNATURE OF INVESTIGATOR**

These are the terms under which I will conduct research.

---

Signature of Investigator

---

Date

## APPENDIX C

## Parent Guardian Consent Form

**Parent/Guardian Consent Form****The 4 W's of Young Female Dancers' Use of Imagery: Where, When, Why and What**

I have read the Letter of Information, have had the nature of the study explained to me, I understand that the information presented in the focus groups will be heard by all participants and therefore will not be strictly confidential, and I agree to allow my child to participate. All questions have been answered to my satisfaction.

I consent to my child participating in the study:      Yes      No

\_\_\_\_\_  
Name of Child

\_\_\_\_\_  
Name of Parent/Guardian

\_\_\_\_\_  
Signature of Parent/Guardian

Date

\_\_\_\_\_  
Signature of Person Obtaining Consent

Date

\_\_\_\_\_  
Name (in print) of Person Obtaining Consent

## APPENDIX D

## Participant Assent Form



University  
of Windsor

**Assent Form**

**The 4 W's of Young Female Dancers' Use of Imagery: Where, When, Why and What**

I am a student researcher, and I am doing a study on the imagery (visualization) you use when you are dancing or in a dance setting. Imagery is the pictures and feelings you form in your mind. I would ask you to be part of a focus group (45-60 min) with 6-8 other dancers around your age.

I want you to know that I will not be telling your teachers, parents, or any other dancer what you answer. The only other people who will hear your responses are the other dancers present in the focus group. I promise to keep everything that you tell me private.

Everything we talk about will be recorded. This will help me remember what you and the others have told me about imagery.

Your parent or guardian has said it is okay for you to answer my questions on the imagery you use in your mind while you are dancing or in a dance setting. Do you think that you would like to answer them? It is fine if you say "no". If you decide to answer the questions you can stop answering them at any time, and you don't have to answer any question you do not want to answer. It is entirely up to you. Would you like to participate in my study?

I understand what I am being asked to do to be in this study, and I agree to be in this study.

---

 Signature

---

 Date

---

 Witness

## APPENDIX E

## Consent for Audio Recording

**CONSENT FOR AUDIO RECORDING**

Child/Research Subjects Name:

Title of the Project: **The 4 W's of Young Female Dancers' Use of Imagery: Where, When, Why and What**

I consent to the audio recording of interviews, procedures, or treatment (of my child).

I understand these are voluntary procedures and that I am free to excuse my child from the discussion at any time, however I am not request that the audio recording be stopped given it is a group discussion. I understand that anything my child says prior to leaving the discussion cannot be withdrawn. I also understand that my name (or my child's name) will not be revealed to anyone and that taping will be kept confidential. Audio files are numbered only and stored in a locked cabinet.

The destruction of the audio recording will be completed 5 years after the study is completed.

I understand that confidentiality will be respected and that the audio files will be for professional use only.

\_\_\_\_\_  
(Signature of Parent or Guardian)

\_\_\_\_\_  
Date

OR

\_\_\_\_\_

\_\_\_\_\_

## APPENDIX F

## Studio Consent Form

**Studio Consent Form**

My name is Irene Muir and I am currently a student at the University of Windsor in the Faculty of Human Kinetics. I am completing a research project looking at young female dancers' use of imagery (visualization). The proposed research has been cleared by the University of Windsor's Research Ethics Board. I am seeking permission to recruit dancers from your studio as participants for my study. With your permission, I will approach the participants' parent/guardian prior to or after class explaining the purpose of the study and its requirements. Female dancers 7-14 years of age who have been training in their respective style for at least two year are eligible to participate. Their participation includes taking part in a focus group with their peers (which will take 45-60 minutes to complete) and their participation is voluntary. If you have any questions or concerns about the research, please feel free to contact Ms. Irene Muir at (519)-253-3000 (x4058) [muiri@uwindsor.ca](mailto:muiri@uwindsor.ca) or her advisor Dr. Krista Chandler at (519)-253-3000 (x2446), [chandler@uwindsor.ca](mailto:chandler@uwindsor.ca).

I have read the Letter of Information, have had the nature of the study explained to me and I agree to allow dancers from my studio to be recruited for this study. All questions have been answered to my satisfaction.

---

(Signature of Parent or Guardian)

---

Date

## APPENDIX G

## Recruitment Script to Parents/Guardians

Hello, my name is Irene Muir and I am currently completing my Master's degree in Sport and Exercise Psychology at the University of Windsor under the supervision of Dr. Krista Chandler. We are conducting a study on young female dancers' imagery use (visualization). Clearance to conduct this research study has been received from the University of Windsor Research Ethics Board. In addition, I have received written consent from the head instructor of your daughter's studio.

I want to request your permission for your daughter to participate in our study. The goal of the study is to determine where, when, why and what young female dancers' are imaging. Your child will meet with myself and a group of their peers to participate in a one-time focus group (45-60 minutes) at the Sport Psychology and Physical Activity Research Centre (SPPARC) at the Human Kinetics Building at the University of Windsor. Participants will be entered into a draw to win one of two \$50 gift cards to Motions 1.

Your assistance and cooperation with this research is greatly appreciated. I am happy to answer any questions, comments, and feedback you may have.

## VITA AUCTORIS

NAME: Irene Muir

PLACE OF BIRTH: Windsor, Ontario, Canada

YEAR OF BIRTH: 1993

EDUCATION University of Windsor, Windsor, Ontario  
2015-2017, Master of Human Kinetics

The University of Windsor, Windsor, Ontario  
2011-2015, B.H.K Honors Specialization in Movement  
Science

Riverside Secondary School, Windsor, Ontario  
2007-2011