AN EXPLORATORY STUDY: THE INTERSECTION OF IMAGERY ABILITY,

IMAGERY USE, AND LEARNING STYLE

by

GINA BOLLES

A THESIS

Presented to the Department of Dance
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Fine Arts

June 2008

"An Exploratory Study: The Intersection of Imagery Ability, Imagery Use, and Learning Style," a thesis prepared by Gina Bolles in partial fulfillment of the requirements for the Master of Fine Arts degree in the Department of Dance. This thesis has been approved and accepted by:

_____

Steven J. Chatfield, Ph.D., Chair of the Examining Committee

6/2/08

Date

Committee in Charge: Steven J Chatfield, Ph.D., Chair
                                       Amy Stoddart, M.F.A.
                                       Alison Snyder, M.Arch.

Accepted by:

_____

Dean of the Graduate School

An Abstract of the Thesis of

Gina Bolles   for the degree of   Master of Fine Arts

in the Department of Dance   to be taken   June 2008

Title: AN EXPLORATORY STUDY: THE INTERSECTION OF IMAGERY ABILITY,

IMAGERY USE, AND LEARNING STYLE

Approved: _____
Steven J. Chatfield, Ph.D.

This study explores the intersection of the individual's imagery ability, imagery use

in dance training and performance, and learning style. Thirty-four intermediate-level ballet

and modern dance students at the University of Oregon completed the Movement Imagery

Questionnaire-Revised (MIQ-R) and Kolb's Learning Style Inventory-3 (LSI-3). The four

highest imagers and the four lowest imagers participated in interviews. Thirty of 34

subjects averaged MIQ-R scores indicating relative ease when imaging. On the LSI-3, 27

subjects reported a preference for "feeling" over "thinking" when gathering information for

learning. Data revealed differences between perceived imagery ability and ability as

determined by the MIQ-R for both high and low imagers. High imagers also recalled early

exposure to imagery in dance while the low imagers did not. The research suggests that

imagery may be a good pedagogic tactic for reaching "feeling" dance learners.

This thesis includes my co-authored materials.

CURRICULUM VITAE

NAME OF AUTHOR: Gina Bolles

PLACE OF BIRTH: San Diego, CA

DATE OF BIRTH: February 13, 1981

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

   University of Oregon, Eugene, OR
   University of California Los Angeles, Los Angeles, CA

DEGREES AWARDED:

   Master of Fine Arts in Dance, 2008, University of Oregon
   Bachelor of Arts in Communication Studies and Political Science, 2003
      University of California, Los Angeles

AREAS OF SPECIAL INTEREST:

   Imagery in Pedagogy and Learning
   Non-narrative Dance Concert Design, Composition, and Collaboration

PROFESSIONAL EXPERIENCE:

   Graduate Teaching Fellow, Department of Dance, University of Oregon,
      2005-2008
   Choreographer, Interlochen Arts Camp, Interlochen, MI, 2006

GRANTS, AWARDS AND HONORS:

Labanotation Certification, Elementary Level, Dance Notation Bureau, 2008

Georgianne Teller Singer Dean's Fellowhip, University of Oregon Department of Dance, 2007

Gary E. Smith Summer Research Grant, The Graduate School, University of Oregon, 2007

Center for the Study of Women in Society Graduate Student Research Grant, University of Oregon, 2007

President of Dance Oregon, University of Oregon, 2007-2008

Donald and Darel Stein Graduate Student Teaching Award Nominee, University of Oregon , 2007

ACKNOWLEDGMENTS

This work is dedicated to my mother and father for sharing their ambition and enthusiasm for arts education with me.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

Researchers generally agree that imagery, a mental representation of an actual

visual or kinesthetic event, is an effective tool in dance learning and performance. It is

used, for example, to facilitate alignment by training dancers to perceive body segments

and total body images from internal and external perspectives, to enhance kinesthetic

perception for skill acquisition, to alleviate performance anxiety, and to encourage

choreographic creativity in movement exploration and problem solving.

Because of the potential implications for advancement in dance training and

performance, it is important to identify the characteristics of the imager. What factors

may have influenced this person's ability to image? What background or current

experiences may have influenced this person's imagery use?

Results from the Survey of Dance Teachers and the Systematic Observation

Instrument indicate that imagery is often used in dance classrooms by both teachers and

learners (Overby 1990a; Minton 1996). Similarly, it is used in sport-based movement

contexts to enhance motor skill acquisition and performance (Munrow, Giacobbi, Hall,

and Weinberg 2000). Although it is generally held that mental imagery can influence

motor task performance, few studies have been able to evidentially support a correlation

(Hall 1985). One explanation may be that individuals vary in imagery ability, and

studies fail to classify subjects as high or low imagers before assessing imagery training on task performance (Hall and Martin 1997). Outside the realm of dance and sport, individual differences in imagery ability have been shown in studies of the neurological processes involved in mental imagery (Klein, Paradis, Poline, Kosslyn, and Le Bihan 2000; Kunzendorf and Hall 2001). One study suggests that imagery use may be more related to an imagic cognitive tendency than a verbal tendency (O'Halloran and Gauvin 1994). Other evidence indicates that individuals' decisions to use imagery may be related to confidence in one's ability to image in order to achieve a certain outcome (Short, Tenute, and Feltz 2005).

Prevalent in the research is the suggestion that imagery use is related to high-level dance performance. High-level dancers in a range of idioms implement imagery techniques more often and more successfully in terms of complexity, control, and sensory involvement, than low-level dancers (Nordin and Cumming 2006b). Since high imagery ability and usage are often associated with advanced technical dance ability, it is essential to seek insight into what may have facilitated the development of imagery ability and usage in these dancers.

Educational research has proposed that individuals vary in the ways that they gather and process information. Learning style classification systems have been developed to describe individual strategies for learning. The question, *Who is the imager?,* may be answered by determining the relationship between the individual's imagery ability, imagery use, and learning style.

One learning style classification system, and perhaps the most often employed as an individual learning style assessment, is Kolb's Learning Style Inventory (LSI). Kolb's conceptual approach to classifying learning style is based on two facets: 1) how we gather information (thinking or feeling), and 2) how we process information (doing or watching) (Kolb 1984). Kolb's inventory defines four learning styles based on the permutations of these two intersecting facets. "Convergers favor abstract conceptualization and active experimentation [thinking and doing] while Divergers emphasize reflective observation and concrete experience [watching and feeling]. Accomodators value active experimentation and concrete experience [doing and feeling], while Assimilators prefer abstract conceptualization and reflective observation [thinking and watching]" (Bokoros, Goldstein, and Sweeny 1992, 103). Distinctions between learning styles are made in educational research so that teachers may best pedagogically strategize to reach students, and so that students can best strategize for learning.

The intent of this research is to search for an intersection between imagery ability, imagery use, and learning style. Currently, there is no research on this relationship. Researchers in the fields of dance, sport, and psychology have investigated and continue to explore *where* imagery is used, *when* it is used, *why* it is used, and *what* type of imagery is used. Few researchers, however, are seeking answers to the fifth question of imagery: *who* is the imager?

This thesis includes a review of the existing literature in Chapter II, and an article that was co-authored with Steven J. Chatfield in Chapter III.

Purpose Statement

The purpose of this study is to conduct exploratory research on the intersection of: 1) the individual's movement imagery ability, 2) the individual's imagery use in dance training and performance, and 3) the individual's learning style. Some relevant questions are:

Do high imagers and low imagers sort across learning styles?

Do certain learners prefer using certain types of imagery?

What learning experiences may have influenced a dancer's ability to image and his/her implementation practices?

Delimitations

This research includes both quantitative and qualitative research elements. Due to the time-intensive nature of gathering qualitative data sets, the study sample was delimited to participants in the DANC III ballet and modern courses in the Department of Dance at the University of Oregon. All consenting participants in these classes completed the Movement Imagery Questionnaire-Revised (MIQ-R) and the Learning Style Inventory-3 (LSI-3). The three highest scorers and the three lowest scorers of the MIQ-R were selected to participate in an subsequent interview series.

Significance of Study

This study is significant for its effort to fill a gap in the existing literature on imagery in dance training and performance. The intersection of imagery and learning

style is a novel research focus, and therefore, necessitates a purely exploratory, non-hypothesizing, and non-critical paradigm. This research is a first effort to provide basic information on the relationship between imagery ability, imagery use, and learning style.

Current research suggests that mental imagery is often employed as a teaching tool in the dance classroom, though imagery cues may or may not be effective for learners due to individual differences in imagery ability, imagery usage, and learning styles. Researchers have yet to determine what characteristics are associated with high or low imagery ability and imagery use.

Most of the research in this field has been conducted under quantitative frameworks, questioning, for example, the score of one's imagery ability, how often one images, or the occurrences of imagery use for a specific purpose. The qualitative research that has been conducted in the field has only been concerned with experiences within dance classrooms. This study combines quantitative and qualitative paradigms to consider these in-class experiences, but also looks beyond the dance studio in order to investigate factors external to dance training and performance that may influence the individual's imagery ability and use, such as learning style.

This research is significant for both teachers and students of dance. Identifying who best receives and processes imagery cues and what factors may contribute to this ability and personal implementation may improve future pedagogic strategies for teachers and learning strategies for students.

CHAPTER II

REVIEW OF LITERATURE

The following review surveys research on imagery in dance education and performance, imagery in sport psychology, and learning styles in education.

Much of the available literature on imagery in dance has been concerned with the prevalence of imagery cuing by teachers. It is well known that imagery is a teaching tool often employed in dance learning for all idioms. Two research instruments have been designed to provide information on the use of imagery by dance teachers in the classroom: the Survey of Dance Teachers (SDT) and the Systematic Observation Instrument (SOI) (Overby 1990a). The Survey of Dance Teachers (SDT) is a self-report questionnaire composed of 60 Likert scaled questions. It was designed to investigate the perceived imagery ability of dance teachers, the extent of use of visual or kinesthetic imagery cues in beginning, intermediate, and advanced classrooms, as well as the extent of direct and indirect imagery cues. The Systematic Observation Instrument (SOI) requires a trained observer to watch a class and record each use of visual, kinesthetic, direct or indirect imagery when used as a teaching cue. It also notes the recipient of the imagery cue and the percentage of time that specific imagery cues are used by the teacher.

Both of these tools categorize imagery as visual, kinesthetic, direct, or indirect. Visual imagery involves forming a mental picture (for example, mentally picture yourself performing a *pirouette* – see the preparation in fourth position, the spring into *retiré*, the revolution, and the closing into fifth position). Kinesthetic imagery involves imagining the feeling of a movement (for example, imagine the feeling of performing a *pas de chat*. Imagine the feeling of your muscles engaging and your feet pushing off the floor). Direct imagery, which may be visual or kinesthetic, elicits an image of a specific movement (for example, see or feel yourself do a *grand battement*). And indirect imagery, sometimes called metaphoric imagery, involves relating to an external object or idea (for example, imagine performing this phrase as if you were in a vat of honey). (Appendix A provides a comprehensive glossary and dance-specific examples of these and other imagery categories.)

Minton (1996) assessed and described dance teacher usage of imagery as cue or feedback in the classroom using the SOI. She conducted a descriptive study that categorized imagery usage by form: kinesthetic, visual, direct, and indirect. The SOI allowed her to note the recipient of the imagery cue (e.g. whole class, one student) and the rate of imagery usage per minute by teacher. In this study, a trained observer watched 15 college jazz and modern classes of beginning and intermediate level at the beginning, middle, and end of the semester. The observer recorded and tallied each use of imagery by the teacher on a graph when that image was used as a teaching tool.

Minton's results showed that the seven dance teachers used more visual than kinesthetic imagery, though they differed more widely in the number of kinesthetic

images used in comparison to the number of visual images used across teachers. The seven dance teachers also used more direct imagery than indirect imagery. Imagery was used more often in the intermediate classes than in the beginning classes, and in modern dance classes more than jazz dance classes. The lowest rate of imagery was recorded at the beginning of the semester. As the rate of imagery increased, so did the teacher's use of kinesthetic, visual, and direct imagery. Overby's and Minton's works illustrate the pervasiveness of imagery techniques in dance training, but leave the question of the imager's characteristics unanswered.

Like teachers, learners in movement settings are also employing imagery cues to enhance motor skill acquisition. Munroe, Giacobbi, Hall, and Weinberg (2000) identified and described the imagery deemed important and used by athletes, and synthesized information on where, when, why, and what imagery was used in a single study. Fourteen elite athletes, seven male and seven female, were interviewed to assess imagery use. Two investigators conducted a qualitative data analysis that divided interview transcripts into text units, a sentence or phrase containing one idea. Text units were then compared and regrouped according to similar meaning.

Participant responses indicated that imagery was used in training and competition (where). It was used during and outside of practice, and before, during, and after competition (when). It was used to fulfill various cognitive and motivational functions: Cognitive Specific (CS) imagery is the mental rehearsal of specific skills for development or execution (for example, imagine yourself doing a perfect *tour jeté*); Cognitive General (CG) imagery is the mental rehearsal for strategy development or

execution (for example, imagine yourself warming up your quadriceps in order to jump higher); Motivational Specific (MS) imagery involves imagining goals of performance and outcome (for example, imagine yourself performing so well that you are offered a contract with a company following the performance); Motivational General-Arousal (MG-A) imagery relates to the arousal and stress associated with sport (for example, imagine the feeling of your palms sweating as the curtain rises); and Motivational General-Mastery (MG-M) imagery is the imaging of mental toughness, focus, confidence, and positivism (for example, imagine yourself squelching feelings of nervousness before a Performance) (why) (see Appendix A for complete definitions and examples of these imagery categories). These athletes reported that images are usually accurate and vivid, more positive than negative, and both visual and kinesthetic. They integrate surroundings and both internal and external perspectives (what). This research provides information on four Ws of imagery use. The fifth W, *who*, still remains a mystery.

While it is evident that imagery is a well-used tool by teachers and learners in dance and sport, it is also apparent in the literature that there are individual differences in imagery ability and use. The Movement Imagery Questionnaire (MIQ) was developed as a survey to assess visual and kinesthetic movement imagery ability based on Likert-scale scoring of imagery ease or difficulty (Hall 1985). The MIQ-Revised (MIQ-R) is an eight-item, self-report questionnaire in which each item is comprised of four steps: 1) description and assuming of starting position, 2) description and performance of movement (movement consists of arm, leg, or whole body motion), 3)

reassuming of starting position and visual or kinesthetic imaging of movement, and 4) rating of ease or difficulty in imaging of movement (Hall and Martin 1997). With a high test-retest coefficient (.83 for a 1-week interval) and a high internal consistency coefficient (.87 for the visual subscale, and .91 for the kinesthetic), the MIQ-R has been shown to be reliable and to possess a stable internal structure. It enables researchers to classify individuals as high or low imagers before assessing performance changes from training.

Specifically among dancers, evidence suggests a difference between novice and experienced dancers' imagery abilities. Twenty experienced female dancers, with five or more years of dance training, and twenty novice dancers, with one year or less training, completed four questionnaires as measures of imagery ability (Overby 1990b). The Scale for the Appraisal of Movement Satisfaction (SAMS) measured the image that the dancer has of herself as a mover. The Movement Imagery Questionnaire (MIQ) measured separate visual and kinesthetic imagery abilities. The Individual Differences Questionnaire (IDQ) measured the habitual use of visual and verbal thinking modes. Another test, the Stumpfs Cube Test (SCT), measured visual-spatial ability. The experienced dancers returned significantly higher scores than the novice dancers on the SAMS, IDQ, and SCT, indicating that higher-level dancers with more dance experience may be related to the skill of imaging a moving body, the development of visual-spatial ability, and the ability to implement visual and verbal feedback on equal terms.

Differences in imagery ability have not only been suggested by self-report. Scientific studies of the neurological processes involved in mental imagery also indicate

individual differences. Though many believe that visual-mental imagery and visual perception by retinal stimulus share many common neurological processes, Klein, Paradis, Poline, Kosslyn, and Le Bihan (2000) intended to illustrate commonality by testing two hypotheses: 1) the primary visual cortex (area V1, which is housed in the calcarine sulcus) is activated only when the subject images highly detailed pictures, and 2) area V1 is activated whenever images are formed.

Eight subjects participated in six replicate trials of ten imagery cues. Highly sensitive event-related functional magnetic resonance imaging (ER-fMRI) detected and characterized activity in the calcarine cortex when subjects first imaged an animal and then a concrete or abstract characteristic of that animal. Significant activation was detected in the calcarine cortex in all instances of visual-mental imagery, both when an image was formed and when the image was evaluated by focusing on a concrete or abstract detail, though activity was highest when subjects were evaluating characteristic details of their images. Results indicated that, in the absence of a retinal stimulus, the formation of a single mental image can induce a neurological response in the earliest stages of the visual-processing system. The data also revealed individual variability, as the extent of activation varied a large amount across subjects, though subjects were intra-consistent across conditions.

Research has shown that imagery innervates areas in V1 and in the lateral geniculate nucleus (LGN) of the brain. Kunzendorf and Hall (2001) conducted a study that supports the theory that, from there, vivid images centrifugally innervate the optic tract into the retina. Prior to treatment, sixty-six subjects were tested for imagery

vividness by matching the color contrast of imagined circles to actual circles on a computer screen. They were also given reality-tests in which they differentiated between imaged letters and actual letters on a computer screen. Once these pre-test scores were obtained, the subjects participated in Short Imaging treatment and Long Imaging treatment sessions. In Short Imaging treatment, subjects engaged in "imageless thinking" for 50 seconds, then imaged a bright light for 10 seconds. Five seconds later, a flash-evoked electroretinogram (ERG) was recorded. In Long Imaging treatment, subjects imaged a bright light for 60 seconds before the flash-evoked ERG was recorded.

For highly vivid imagers, Long Imaging resulted in a smaller flash-ERG amplitude, seemingly because vivid images of a bright light impact retinal fatigue in the way that visually perceiving a bright light for a long time does. In contrast, there was no flash-ERG amplitude difference between Long and Short treatment sessions for those imagers that did not score as highly on the image-vividness-matching test.

While these studies demonstrate that individuals vary in the neurological processes of imagery use, the factors that influence an individual's decision to use imagery are still largely unknown. Short, Tenute, and Feltz (2005) speculated that one factor may be efficacy in using imagery, or one's confidence in one's ability to image in order to achieve a certain outcome. In fact, the authors further conjectured that efficacy in imagery ability mediates imagery use; that is, how often athletes use imagery may be predicted by perceived efficacy rather than their actual imagery ability.

To test these hypotheses, Short, Tenute, and Feltz administered the Sport Imagery Questionnaire (SIQ) and the Movement Imagery Questionnaire-Revised (MIQ-R) to 74 undergraduate female athletes. The SIQ measured the frequency of imagery use on five subscales: Cognitive General (measuring imagery use for strategy), Cognitive Specific (imaging particular skills), Motivation Specific (goal-oriented imagery), Motivation General (for imaging mastery) and Motivation General (for imaging arousal). The MIQ-R assessed visual and kinesthetic imagery ability by self-report of ease or difficulty of a "see" or "feel" task. The SIQ was also modified to measure efficacy in using imagery by asking participants to rate their confidence in their ability to use Cognitive General imagery, and so forth.

As predicted, results showed that the more an athlete was confident in her ability to use an image, the more she tended to use it. This finding suggests that helping an athlete build confidence in her imagery ability may facilitate her imagery usage. Though individual differences in imagery ability are thought to be a product of experience interacting with genetic variability, one confounding variable to consider in the measurement of confidence is an athlete's prior training in imagery techniques, as Short, Tenute, and Feltz agree that it is a skill that can be improved by practice.

In fact, imagery may be a skill that can be learned. Rodgers, Hall, and Buckolz (1991) conducted research with a threefold purpose: 1) to determine whether or not imagery ability is improved by systematic imagery training, 2) to determine whether or not imagery training influences imagery use, and 3) to determine the effects of imagery training on performance, as compared to another cognitive intervention strategy,

verbalization. Twenty-nine figure skaters were randomly divided into an imagery group and a verbalization group, then each measured for imagery ability (MIQ), imagery use (using a modified version of the Imagery Use Questionnaire), and skating performance (using attempt and success rates on Canadian Figure Skating Association tests and observation by an independent expert). Eleven additional skaters served as the control group. Following initial testing, the 29 treatment subjects underwent 12 weeks of imagery or verbalization training. Training was limited to technical free skating elements. For example, subjects in the imagery group were asked to image an entry into a jump, while subjects in the verbalization group were asked to describe an entry into a jump using cue words. All skaters were also allowed a maximum of two free skating sessions a day.

Post-test results indicated significant visual imagery improvements in the imagery group according to the MIQ. Skaters from the imagery group also became more likely to use imagery techniques before and after practice, especially kinesthetic imagery, and imagery from an internal perspective. In terms of performance, though the imagery group subjects made more attempts on tests, verbalization subjects had higher average success rates. The apparent suggestion that verbal cues better enhance performance than imagery cues is undercut by the fact that subjects were not tested for imagery ability before being divided into imagery and verbalization test groups in order to assure relative equality. In addition, one may wonder if you can use words to describe an entry into jump without actually picturing it. The verbalization group may too have been imaging. Nonetheless, the overall data suggest that imagery is a skill that

can be conditioned and improved. This is important when considering the relationship between imagery usage and learning style, for ways of learning may influence the effectiveness of imagery training, and therefore its potential effect on dance performance.

While Rodgers, Hall, and Buckolz separated imagery and verbalization as cognitive intervention strategies, O'Halloran and Gauvin (1994) define both thinking in pictures and thinking in words as imagery preferences. This study is the closest found to offer a specific discussion on the relationship between learning style and imagery ability. The researchers examined the role of imagery preference in the effectiveness of imagery training for enhanced motor performance and imagery vividness. In this study, imagery was defined as the mental rehearsal of a motor task without any overt movement. Imagery preference referred to preferred cognitive style: imagic thinking (pictures) or verbal thinking (words). Imagery vividness referred to the clarity of images.

Fifty-five female undergraduate student and staff volunteers completed the Preferred Imagic Cognitive Style (PICS) questionnaire to identify imagic or verbal thinking tendencies, the Questionnaire upon Mental Imagery (QMI) to score imagery vividness, the Movement Imagery Questionnaire (MIQ) to measure imagery ability, and a VIS, a task-specific questionnaire to measure vividness of imagery for beanbag throwing. Pre-experimental measures tested subjects' performances on a novel motor task, throwing a beanbag into a box placed behind a partition. Participants in the experimental groups received guided mental practice of the task for 15 minutes a day

for five consecutive days. The control groups physically practiced other laboratory motor tasks during this time. On the fifth day, subjects performed the task and repeated the QMI, the MIQ, and the VIS.

Data indicated that treatment and control conditions had significant impact on the performance of the imagic subjects, but not on the performance of the verbal subjects. Additionally, imagic subjects demonstrated superior mental imagery vividness and ability to their verbal counterparts. Though this project is the only effort located that attempted to establish a relationship between preferred cognitive style and the efficacy of imagery training, it does not attempt to intersect learning styles with imagery ability. The existing body of knowledge in imagery studies has yet to fill this gap.

Among the volumes of research on imagery and movement, research is still missing case studies that explore *who* is imaging. In fact, the minimal research that has been conducted in this field has only explored individual histories and exposure to imagery within dance classrooms. In in-depth semi-structured interviews with 14 professional dancers, Nordin and Cumming (2006a) learned that few of these dancers had been taught how to image, they preferred teachers who gave many and varying imagery cues, and imagery use became more frequent, complex, and kinesthetic over the course of their dance training and careers. Upon surveying 250 dancers ranging from recreational to professional standards, Nordin and Cumming (2006b) learned that dancers believed their images to improve in quantity and quality across years in dance. Qualitative improvements included increased complexity, control, structure, deliberation, and sensory involvement. Higher-level dancers reported having been

encouraged to image more frequently and more metaphorically, both historically and at present, than lower-level dancers. Though this provides interesting insight, as a cross-sectional snapshot, it cannot rule out the possibility that elite dancers have this ability innately. While this research provides valuable information on individual, highly dance-skilled imagers, it only explores imagery histories within the dance classroom. The proposed research will consider this information in addition to factors outside of dance, like learning style.

The main factor considered in coordination with imagery ability and use in this research was learning style. Scholars agree that teachers and students benefit from identifying learning styles within the classroom. Distinctions between learning styles are made in educational research so that teachers may best pedagogically strategize to reach students, and so that students can best strategize for learning. In an effort to integrate similarities among learning style taxonomies, Bokoros, Goldstein, and Sweeney (1992) examined five classification systems of cognitive behavior. A review of these five measures suggested three common underlying dimensions of cognitive behavior despite differences in conceptual development, application domains, terminology, and response format. Factor analysis of 143 subjects' responses on 1) the Myers-Briggs Type Indicator (MBTI), 2) the Gregorc Style Delineator (GSD), 3) the Learning Style Inventory (LSI), 4) the Decision Style Inventory (DSI), and 5) Lifescripts (LFS) confirmed a convergence on three dimensions: thinking/feeling, information-processing, and attentional focus.

Among these and other systems for classifying learners, Kolb's Learning Style Inventory (LSI) has remained one of the most prominent since the mid-1970s. Designed to test for a preferential learning mode, the LSI is based on Kolb's (1984) Experiential Learning Theory (ELT), which argues that learning occurs on four levels: through 1) concrete experience, 2) reflective observation, 3) abstract conceptualization, and 4) active experimentation (see Figure 1).

Figure 1. Kolb's Learning Styles

	Information-Processing	
	Active Experimentation (AE)	Reflective Observation (RO)
Abstract Conceptualization (AC)	Convergers	Assimilators
Concrete Experience (CE)	Accomodators	Divergers

Information-Gathering

Concrete experience (CE) involves direct experience, including feelings and emotions. Reflective observation (RO) involves looking back on experience and recollecting and reorganizing information. Abstract conceptualization (AC) refers to the creation of meaning from experience and the use of this new information to guide future actions. And active experimentation (AE) involves testing new information by putting it into action. CE and AC exist at opposite ends of a spectrum that defines how we gather information, and RO and AE are opposite modes of processing information. Though the theory suggests that all people use every mode of learning, there may be learning style

preferences based on the intersection of the information-gathering and information-processing facets. Those who prefer AC/AE modes of learning are termed Convergers. Those who tend toward AC/RO modes of learning are Assimilators. Those who prefer CE/AE modes of learning are deemed Accomodators. And those who tend toward CE/RO modes of learning are Divergers.

Historically, Kolb's Learning Style Inventory has been criticized for several psychometric problems: ipsative scoring, questionable factor structure, response-set bias, and reliability and validity (Henson and Hwang 2002). Ipsative scoring requires responses to be rank-ordered. In other words, the score for one item is dependent on the scores for other items. Ipsative ranking creates negative correlations among measured attributes. However, despite potential limitations, research suggests that factor analysis can still yield interpretable responses from ipsative data (Kayes 2005).

The aforementioned criticisms have been made for the LSI, the LSI-2, and the LSI-2A. The most current version, the LSI-3, revised in 1999, addresses each of these main criticisms. It consists of 12 sentence stems with four ending options, each associated with one learning style. Each ending is given a score of 1, 2, 3, or 4, where 4 is the most preferred. In a recent study, 221 subjects completed the LSI-3. Results revealed internal validity and reliability and strong support for the two-factor structure (Factor 1 being the RO versus AE dimension, and Factor 2 being the AC versus CE dimension) (Kayes 2005). Despite its history of controversy, to this date, Kolb's inventory is still one of the most influential and widely used learning styles taxonomies (Kayes 2005), and thus the system selected for the proposed research.

In this research, a quantitative research framework provided a quantifiable intersection between imagery ability and learning style by rank order correlating the MIQ-R and the LSI-3. A second stage of research, qualitative data collection, included three in-depth case studies. Marshall and Rossman (1995) have identified four general research purposes best served by qualitative inquiry: exploratory, explanatory, descriptive, and predictive. The qualitative approach, they say, "is uniquely suited to uncovering the unexpected and exploring new avenues" (26). It is especially suitable for questions without existing hypotheses. In such cases where there is no expectation for outcome, as is the case in the question of the imagery and learning style intersection, qualitative data have the ability to direct and develop new hypotheses. Furthermore, qualitative studies fill gaps in the current literature in a given field as they often examine difficult and complex issues that cannot be easily quantified or understood by causality. In fact, the stories uncovered in qualitative research "defy the anonymity of a number" (Seidman 1998, 3). Often, qualitative research attempts to understand and know a person so deeply as to construct a descriptive text of human behaviors, objectives, and experiences as they are met in life (Van Manen 1990). This "strong and rigorous human science text distinguishes itself by its courage and resolve to stand up for the uniqueness and significance of the notion to which it has dedicated itself" (Van Manen 1990, 18).

Interview design models suggest that interviewers examining a subject in one meeting are treading "on thin contextual ice" (Seidman 1998, 11). The three-interview series used in this study "allows the interviewer and participant to plumb the experience

and to place it in context," for "people's behavior becomes meaningful and understandable when placed in the context of their lives and the lives of those around them" (Seidman 1998, 11).

An advantage of qualitative research is the allowance for personal investment in the work. Qualitative researchers engage personally with their research; they are mindful not to ignore the autobiographical element that drives their scholarly effort. The phenomenological hermeneutics branch of qualitative research does not deny the researcher's presence in the work, but instead asks that it be examined as part of the interpretation. To understand the meaning of a text is to understand the historically and culturally determined self (McNamara 1999). The interviewer will share what meaning may be made of their work (Seidman 1998, 110), while remembering that "although the interviewer can strive to have the meaning being made in the interview as much a function of the participant's reconstruction and reflection as possible, the interviewer must nevertheless recognize that the meaning is, to some degree, a function of the participant's interaction with the interviewer" (Seidman 1998, 16). Because the interviewer will gather, prepare, and analyze the data, her presence in the making of meaning cannot be denied.

Another advantage of qualitative research is paradigmatic flexibility. In *Researching the Lived Experience* (1990), Van Manen points out, "The methodology of phenomenology is such that it posits an approach toward research that aims at being presuppositionless; in other words, this is a methodology that tries to ward off any

tendency toward constructing a predetermined set of fixed procedures, techniques and concepts that would rule-govern the research project" (29).

In summary, both teachers and students are using imagery in dance classrooms. Although it is generally held that mental imagery can influence motor task performance, few studies have been able to evidentially support a correlation. One explanation may be that individuals vary in imagery ability and imagery use.

Educational research has proposed that individuals also vary in the ways that they gather and process information. Learning style classification systems, like Kolb's, have been developed to describe individual strategies for learning. The intent of this work was to search for an intersection between imagery ability, imagery use, and learning style. Both quantitative and qualitative research methods were employed to determine the characteristics of the imaging learner.

Introduction to Methods

Using the aforementioned research as a starting place, this study was designed to gather new information by quantitative and qualitative research. In the quantitative data collection phase, students in the University of Oregon's Department of Dance volunteered to complete the MIQ-R and the LSI-3. Results of the MIQ-R and LSI-3 were analyzed by descriptive visual relationship. The descriptive visual relationship was achieved by assessing the frequency distribution of learning styles among high and low imagers. Graphs were drawn to illustrate the relationships between average MIQ-R score and learning style.

The second phase of research employed in-depth interviewing. The study sample for qualitative research was delimited to eight case studies from the larger quantitative sample. Four high scorers and four low scorers on the MIQ-R were selected as case studies for qualitative research comprised of a three-part, face-to-face interview series. In this series, the first interview focused on the participant's life history and established the context of the participant's experience. The second interview then allowed participants to reconstruct the details of their current contextual experience. Finally, in the third interview, participants were given the chance to reflect on the meaning of their past and present experiences together and also to consider the implications for the future. I developed the three-part interview instrument based on questions of imagery in the existing literature with an eye toward my own special interest in the evolution of imagery ability and use. Questions were arranged so that the interviewee considered her background experience first, then her current contextual experience, and finally the integration of the past and present and implications for the future.

Following the interview process, audio recordings of the interviews were transcribed and analyzed. I tracked emergent themes across subjects by organizing excerpts from the interview transcripts into categories. Passages that repeated aspects of the experience from previous passages, and those told in a striking manner, helped to connect the ideas from passage to passage and participant to participant.

CHAPTER III

AN EXPLORATORY STUDY: THE INTERSECTION OF IMAGERY ABILITY,

IMAGERY USE, AND LEARNING STYLE

This chapter was developed in collaboration with Steven J. Chatfield, Ph.D.

Although I designed, implemented, and interpreted the results of this study myself,

Steven J. Chatfield co-authored this chapter by providing significant editorial support.

Introduction

Researchers generally agree that imagery, a mental representation of an actual

visual or kinesthetic event, is an effective tool in dance learning and performance. It is

used, for example, to facilitate alignment by training dancers to perceive body segments

and total body images from internal and external perspectives, to enhance kinesthetic

perception for skill acquisition, to alleviate performance anxiety, and to encourage

choreographic creativity in movement exploration and problem solving.

Because of the potential implications for advancement in dance training and

performance, it is important to identify the characteristics of the imager. What factors

may have influenced the dancer's ability to image? What background or current

experiences may have influenced the dancer's imagery use?

Results from the Survey of Dance Teachers and the Systematic Observation

Instrument indicate that imagery is often used in dance classrooms by both teachers and

learners (Minton 1996; Overby 1990a). Similarly, it is used in sport-based movement

contexts to enhance motor skill acquisition and performance (Munroe, Giacobbi, Hall,

and Weinberg 2000). Although it is generally held that mental imagery can influence

motor task performance, few studies have been able to evidentially support a correlation

(Hall 1985). One explanation may be that individuals vary in imagery ability, and

studies fail to classify subjects as high or low imagers before assessing imagery training

on task performance (Hall and Martin 1997). Outside the realm of dance and sport,

individual differences in imagery ability have been shown in studies of the neurological

processes involved in mental imagery (Klein, Paradis, Poline, Kosslyn, and Le Bihan

2000; Kunzendorf and Hall 2001). One study suggests that imagery use may be more

related to an imagic cognitive tendency than a verbal tendency (O'Halloran and Gauvin

1994). Other evidence indicates that individuals' decisions to use imagery may be

related to confidence in one's ability to image in order to achieve a certain outcome

(Short, Tenute, and Feltz 2005).

Prevalent in the research is the suggestion that imagery use is related to high-level

dance performance. High-level dancers in a range of idioms implement imagery

techniques more often and more successfully in terms of complexity, control, and

sensory involvement, than low-level dancers (Nordin and Cumming 2006b). Since high

imagery ability and usage are often associated with advanced technical dance ability, it

is essential to seek insight into what may have facilitated the development of imagery

ability and usage in these dancers.

Educational research has proposed that individuals vary in the ways that they gather and process information. Learning style classification systems have been developed to describe individual strategies for learning. The question, *Who is the imager?,* may be answered by determining the relationship between the individual's imagery ability, imagery use, and learning style.

One learning style classification system, and perhaps the most often employed as an individual learning style assessment, is Kolb's Learning Style Inventory (LSI). Kolb's conceptual approach to classifying learning style is based on two facets: 1) how we gather information (thinking or feeling), and 2) how we process information (doing or watching) (Kolb 1984). Kolb's inventory defines four learning styles based on the permutations of these two intersecting facets. "Convergers favor abstract conceptualization and active experimentation [thinking and doing] while Divergers emphasize reflective observation and concrete experience [watching and feeling]. Accomodators value active experimentation and concrete experience [doing and feeling], while Assimilators prefer abstract conceptualization and reflective observation [thinking and watching]" (Bokoros, Goldstein, and Sweeney 1992, 103). Distinctions between learning styles are made in educational research so that teachers may best pedagogically strategize to reach students, and so that students can best strategize for learning.

This study explores the intersection of movement imagery ability, imagery use, and learning style. Initial questions that inspired this inquiry include: Do high imagers

and low imagers sort across learning styles? Do certain learners prefer using certain types of imagery? What learning experiences may have influenced a dancer's ability to image and his/her implementation practices? Currently, there is no research on this relationship. Researchers in the fields of dance, sport, and psychology have investigated and continue to explore *where* imagery is used, *when* it is used, *why* it is used, and *what* type of imagery is used. Few researchers, however, are seeking answers to the fifth question of imagery: *who* is the imager?

This study is significant for its effort to fill a gap in the existing literature on imagery in dance training and performance. Current research suggests that mental imagery is often employed as a teaching tool in the dance classroom, though imagery cues may or may not be effective for learners due to individual differences in imagery ability, imagery usage, and learning styles. Researchers have yet to determine what characteristics are associated with high or low imagery ability and imagery use. The intersection of imagery and learning style is a novel research focus, and therefore, necessitated a purely exploratory, non-hypothesizing, and non-critical paradigm. This research is a first effort to provide basic information on the relationship between imagery ability, imagery use, and learning style.

Most of the research in this field has been conducted under quantitative frameworks, questioning, for example, the score of one's imagery ability, how often one images, or the occurrences of imagery use for a specific purpose. The qualitative research that has been conducted in the field has only been concerned with experiences within dance classrooms. This study combines quantitative and qualitative paradigms to

consider these in-class experiences, but also looks beyond the dance studio in order to investigate factors external to dance training and performance that may influence the individual's imagery ability and use, such as learning style.

This research is significant for both teachers and students of dance. Identifying who best receives and processes imagery cues and what factors may contribute to this ability and personal implementation may improve future pedagogic strategies for teachers and learning strategies for students.

Methods

This study operated in two methods of inquiry: 1) by means of quantitative analysis and 2) through in-depth interviews. The Office for Protection of Human Subjects approved both phases of research. In the quantitative data collection phase, students in the University of Oregon's Department of Dance volunteered to complete the MIQ-R and the LSI-3. Students were recruited from DANC 370: Modern III and DANC: 372 Ballet III during the Fall 2007 term. The DANC III level is the third of a five-level strata. The dancers enrolled in these classes are advanced-beginning and intermediate movers. This level was selected because of the likelihood of a diverse distribution of imaging abilities. If it is true that high-level dancing is correlated with high imagery ability, then advanced dancers would conceivably return high MIQ-R scores. It was hoped that a sample made up of intermediate dancers would show more spread across imagery abilities, and therefore would allow for more discriminatory power in analysis.

Results of the MIQ-R and LSI-3 were analyzed by descriptive visual relationship. The subjects' raw and standard scores on the MIQ-R were lined up with the nominal data from the LSI-3. The descriptive visual relationship was achieved by assessing the frequency distribution of learning styles among high and low imagers. Graphs were drawn to illustrate the relationships between average MIQ-R score and learning style.

The second phase of research employed in-depth interviewing, in which "the method combines life-history interviewing and focused, in-depth interviewing informed by assumptions drawn from phenomenology" (Seidman 1998, 9). The study sample for qualitative research was delimited to eight case studies from the larger quantitative sample. Four high scorers and four low scorers on the MIQ-R were selected as case studies for qualitative research comprised of a three-part, face-to-face interview series.

In this series, the first interview focused on the participant's life history and established the context of the participant's experience. By asking "*how* did this come to be?" (rather than "*why* did this come to be?"), the interviewer reconstructed a collection of constitutive events in the participant's past. The second interview then allowed "participants to reconstruct the details of their experience within the context in which it occurs" (Seidman 1998, 11). Finally, in the third interview, participants were given the chance to reflect on the meaning of their experience, that is, they were asked to "look at how the factors in their lives interacted to bring them to their present situation" and also to examine the present experience in detail (Seidman 1998, 12). I developed the three-part interview instrument based on questions of imagery in the existing literature with

an eye toward my own special interest in the evolution of imagery ability and use. Questions were arranged so that the interviewee considered her background experience first, then her current contextual experience, and finally the integration of the past and present and implications for the future.

Following the interview process, audio recordings of the interviews were transcribed, and analysis transpired in two stages. First, I prepared a summary of the interviews. The summaries were shown to each interviewee to confirm the accuracy of intended message. The second stage of analysis tracked emergent themes across subjects by organizing excerpts from the interview transcripts into categories. Passages that repeated aspects of the experience from previous passages, and those told in a striking manner, helped to connect the ideas from passage to passage and participant to participant.

Quantitative Findings

Thirty-four of 39 students enrolled in intermediate-level ballet and modern dance courses at the University of Oregon during the Fall 2007 term were present in class on both days that the surveys were administered and volunteered to participate. All participants signed consent forms confirming their anonymous participation. Of the 34 total students surveyed, 16 were enrolled only in Ballet, 8 were enrolled only in Modern, and 10 were enrolled in both courses. The sample consisted of 31 females and 3 males, with ages ranging from 18 to 30.

These subjects completed both the Movement Imagery Questionnaire-Revised (MIQ-R) and Kolb's Learning Style Inventory-3 (LSI-3). The MIQ-R described eight imagery situations (four kinesthetic and four visual) and posed a question on the ease or difficulty of each imagery task. The questionnaire asked subjects to rate the ease or difficulty of each task on a 7-point Likert scale, where a score of 7 indicated that the task was very easy, and a 1 indicated that the task was very difficult. Figure 2 illustrates the frequency distribution of MIQ-R scores for this sample. The MIQ-R scores have separated into four groupings based on average scores for each question. For example, those who scored between 49 and 56 points on the questionnaire averaged ratings above 6 on each task. Those who scored between 41 and 48 averaged ratings between >5 and 6 on each item, and so forth.

Figure 2. Frequency Distribution of MIQ-R Scores
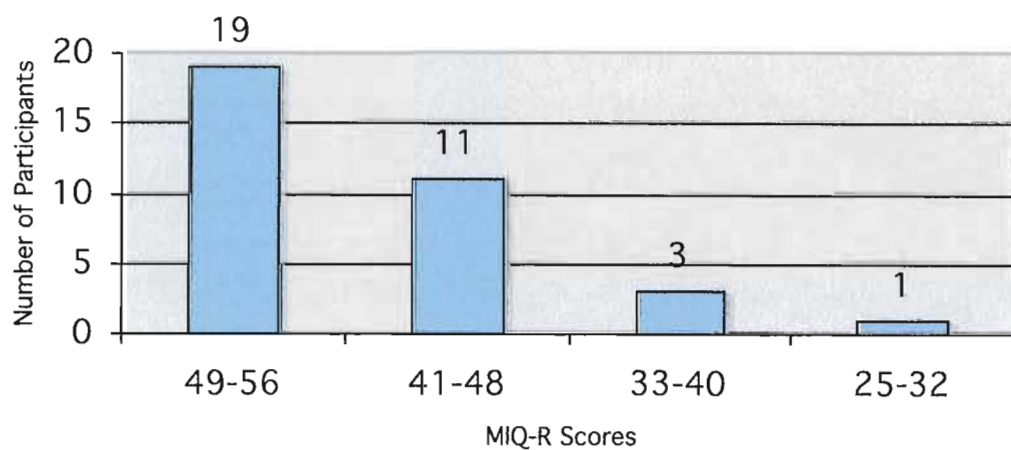
The LSI-3 posed 12 questions of learning preferences. Subjects rated four possible answers for each question with a 1, 2, 3, and 4, such that 4 was "most like you" and 1 was "least like you," with no repeat numbers. Scores were tallied and graphed to determine preferred learning styles.

Of the 34 subjects, 15 were identified as Divergers (i.e. learners who prefer "feeling" to gather information, and "watching" to process information). Twelve subjects were identified as Accomodators (i.e. learners who prefer "feeling" to gather information, and "doing" to process information). Four subjects were identified as Assimilators (i.e. learners who prefer "thinking" to gather information, and "watching" to process information). And three subjects were identified as Convergers (i.e. learners who prefer "thinking" to gather information, and "doing" to process information. Figure 3 illustrates the distribution of learning styles in this sample.

Figure 3. Frequency Distribution of Learning Styles

		Information-Gathering	
		"Feeling"	"Thinking"
Information-Processing	"Doing"	Accomodators **N=12**	Convergers **N=3**
	"Watching"	Divergers **N=15**	Assimilators **N=4**

Figure 4 has synthesized the information from both questionnaires to illustrate the distribution of MIQ-R scores by learning styles.

Figure 4: Distribution of MIQ-R Scores by Learning Styles (N = 34)
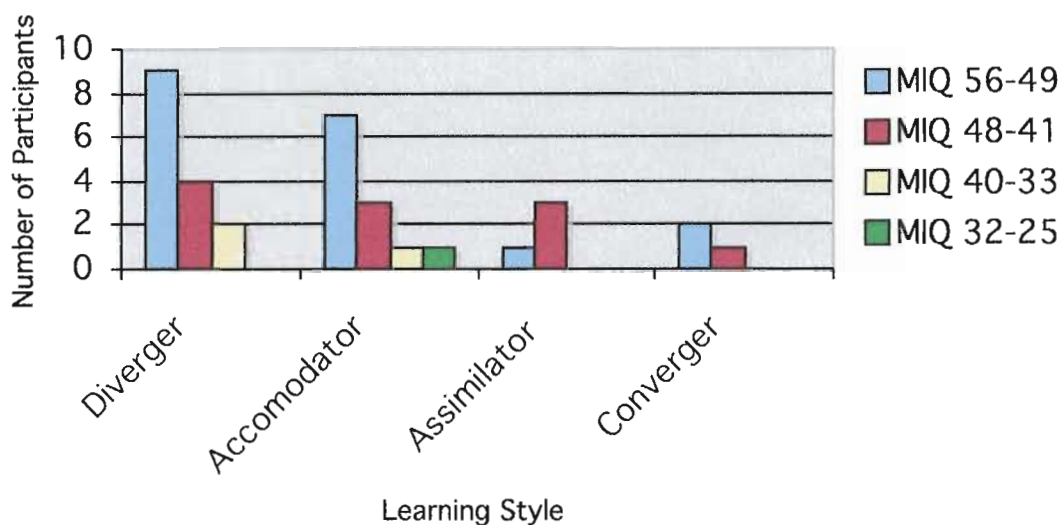
The highest scorers on the MIQ-R, primarily Divergers and Accomodators, share a common preference for "feeling," or Concrete Experience (CE), when gathering information. The CE phase of the learning cycle emphasizes learning by experiencing: "learning from specific experiences, relating to people, and being sensitive to feelings and people" (Kolb 2007, 5). This is in contrast to the Convergers and Assimilators who prefer an Abstract Conceptualization (AC) mode of gathering information. In AC, the learner gathers information by thinking: "analyzing ideas logically, planning systematically, and acting on an intellectual understanding of a situation" (Kolb 2007, 5. Although 10 of the 34 subjects returned LSI-3 scores that positioned them near the

border between learning styles, five of those cases were subjects teetering between the learning styles that emphasize "feeling" when gathering information.

Qualitative Findings

Following the quantitative phase of research, the four highest scoring imagers and the four lowest scoring imagers were selected as case studies for further research. Interestingly, there were two Accomodators and two Divergers at both the top and bottom of the MIQ-R scores. Table 1 has sorted the interview subjects by MIQ-R and LSI-3 scores.

Table 1: Interview Subjects

Subject	MIQ-R	LSI-3	Gender	Age	Enrolled In
Subject 1	Low Imager	Accomodator	Female	21 years old	Modern
Subject 2	Low Imager	Accomodator	Female	22 years old	Modern/Ballet
Subject 3	Low Imager	Diverger	Female	30 years old	Ballet
Subject 4	Low Imager	Diverger	Female	20 years old	Modern/Ballet
Subject 5	High Imager	Accomodator	Female	18 years old	Modern/Ballet
Subject 6	High Imager	Accomodator	Female	20 years old	Ballet
Subject 7	High Imager	Diverger	Female	20 years old	Modern
Subject 8	High Imager	Diverger	Male	30 years old	Modern/Ballet

Each of the eight subjects completed three interviews, where the first interview focused on the subjects' background and experience with imagery and learning, the second interview focused on the subjects' current contextual experience, and the third interview integrated the information from the past and present to determine change over time and predictions for the future. Brief summaries of these interviews are provided in Table 2.

Table 2: Interview Summaries

Subjects: LOW IMAGERS/ACCOMODATORS

Subject 1	Subject 2
Interview 1	**Interview 1**
Subject 1 has been dancing for nearly ten years, and primarily identifies with modern dance, Hip Hop, and African. Although she had exposure to imagery as a child, and can recall certain images given in her ballet and modern classes, she said that she's only become conscious of doing it and noticing imagery cues from teachers in recent years. In her dance learning, she mostly used imagery of the teacher demonstrating movements to process and remember the information. She believes that she was not trained in this skill, but it developed naturally. Her art teachers were the prime examples of imagery use while growing up, and were the only teachers she had who ever used the term "imagery."	Subject 2 has been dancing for 15 years, and now primarily identifies with modern dance. Her high school cross-country coach was her first instructor to incorporate imagery into daily practices. She would mentally review her dances in her head before falling asleep. She feels that this skill developed naturally. She also feels that imagery was more of a suggestion than a verifiable part of learning in her early dance classes. She doesn't have any specific recollections of imagery use by her early dance teachers, and believes that her dance teachers played a small role in her imagery development. She doesn't think that she used imagery actively to help with technique that often.
Interview 2	**Interview 2**
Subject 1 scored a 30 out of 56 on the MIQ-R, but identified herself as a strong imager. She is able to recall imagery cues that were recently given in dance classes, and uses them often in her dance and art history learning. She mostly uses imagery following dance classes to process what she has just done. Sometimes it is difficult to image during a class because she's moving so much. In class, she waits for a teacher to supply an imagery cue rather than create one independently. She responds best to imagery cues when they are fully explained and used more than once. She believes imagery to be effective in helping her process what dance is supposed to feel like. She prefers dance teachers who give a moderate amount of imagery cues, because too many can be confusing.	Subject 2 scored a 33 out of 56 on the MIQ-R, but considers herself a strong imager. She images a lot in dance class, usually before or after a combination. She says that she can't hold an image in her head while she's concentrating on performing an exercise, but she will often return to the image after the experience. She images independently and also responds to cues from teachers. She sees many details and colors in her imagery. She needs new images to be detailed fully, and then later she's able to recall the details when it's referred to quickly. Imagery helps her access physical things in her body. She believes it's effective because it's a connecting concept – it provides ideas for concepts that might be too hard to grasp otherwise.
Interview 3	**Interview 3**
Subject 1 believes that her imagery has become clearer, more complex, and involves more motion now than in the past. Most of her images relate to what she is currently learning. She believes that visualizing helps get movement into her body.	Subject 2 has become more active and conscious of her imagery use recently. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue.

Subjects: LOW IMAGERS/DIVERGERS

Subject 3	Subject 4
Interview 1	**Interview 1**
Subject 3 danced for 10 years, took a 10-year hiatus, and has recently returned to dance. She primarily identifies with the ballet idiom. As an artist, much of her work centers on images and creating meaning through images. She believes that she approaches the world imagistically, that is, she creates images that correlate to some logical thing going on as a means of understanding the world. She was exposed to imagery cues in her early dance classes, but cannot remember a teacher ever using the term "imagery" or explaining why imagery cues were given. She believes that her early dance teachers played a very small role in her imagery development. In fact, she thinks of her imagery ability in a separate context from dance.	Subject 4 danced casually for much of her youth, and began seriously studying different forms in her last years of high school. Today, she primarily identifies with modern dance. She believes that she has always had a great imagination, but only became conscious of developing the skill in high school. She believes that her imagery ability developed naturally. At first, imagery was a form of entertainment. She doesn't remember any of her early dance teachers use the term "imagery," nor does she remember any teachers explain why they were giving imagery cues. She hesitates to qualify the role her dance teachers had on her imagery developments.
Interview 2	**Interview 2**
Subject 3 scored a 37 out of 56 on the MIQ-R, but considers herself a strong imager. She images many times a day. Sometimes she responds to cues from a teacher, and other times she responds to sensory stimulus in her environment. Her images are fleeting, and often lack details. In dance classes, she prefers more direct imagery, but she has noticed that many teachers prefer to give metaphoric cues, and she finds that she responds well to those as well. She finds imagery to be very helpful. She prefers teachers who use a lot of imagery and a variety of types.	Subject 4 scored a 37 out of 56 on the MIQ-R, but considers herself a strong imager. She images multiple times a day and is capable of imaging independently as well as responding to cues from a teacher. Her images are fleeting. Though they may not be highly detailed, her images are vivid in color. She prefers simple imagery, though complex cues can be equally effective if it is something that she relates to easily. She uses imagery because it helps her translate ideas to her body. She likes teachers to use a lot of imagery, especially anatomical imagery.
Interview 3	**Interview 3**
Subject 3 cannot readily identify concrete ways that her imagery has changed over time. She has, however, gained awareness of her imagery practice, and therefore believes that she has more control of her imagery use and its outcome. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue. In the future, she believes that she will continue to become more aware of her imagery use, and her expanded practice will bring more life to her dancing.	Subject 4 identifies the most noticeable shift in her imagery practice over time as the change from predominately metaphoric use to more direct, anatomical imagery. Her imagery practice has become increasingly kinesthetic, although still visual too. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue. She believes that imagery enhances her ability to learn material, and she predicts that she will use it more often and in more areas of her dancing in the future.

Subjects: HIGH IMAGERS/ACCOMODATORS

Subject 5	Subject 6
Interview 1	**Interview 1**
Subject 5 has been dancing for more than 10 years and primarily identifies with ballet. She believes that she was highly imaginative as a child, but no longer identifies herself as imaginative today. She was often encouraged to use imagery in her early dance classes, especially in the form of mental review, though she admits that, for her, imagery use was primarily a form of entertainment. She believes that she was informally taught how to image through encouragement and that her dance teachers played a huge role in her imagery development. She uses imagery in dance and non-dance learning contexts.	Subject 6 has been dancing for nearly fifteen years, and primarily identifies with ballet. She is able to recall many specific cases of personal imagery use and imagery cues by teachers from her early dance technique training. However, she has only recently become aware of its effectiveness in dance classes. She believes that she has always imaged naturally, but that her teachers taught her how to recognize imagery. She believes that imagery use is related to creativity. She claims that her dance teachers were very important in facilitating the development of this skill.
Interview 2	**Interview 2**
Subject 5 scored a 56 out of 56 on the MIQ-R and considers herself a strong imager. She uses imagery in most of her dance classes. Though she can image independently, most often she responds to cues from a teacher. Generally she images from an internal perspective and prefers metaphoric imagery. She can see details and colors in her imagery, but cannot provide examples. She does not have a preference for simple or complex imagery so long as the image is detailed fully. She likes imagery because it helps her get into the movement. She has found that it is a good learning tool and admits that it may work so well for her because her background was largely made up of imagery. She likes teachers to use a lot of imagery and a variety of types.	Subject 6 scored a 56 on the MIQ-R and considers herself a strong imager. She uses imagery a lot in dance classes. She is able to respond to cues given by a teacher in a present context, and she is also able to independently recall images given to her by former teachers. Generally, she images from an internal perspective and prefers metaphoric imagery. Her images are moving and very colorful. She likes complex imagery and prefers images to be detailed fully when given. She finds that imagery is very effective for her because, if she can think of parts of her body as objects metaphorically, her body automatically goes where it needs to. She believes it's like another kind of body memory.
Interview 3	**Interview 3**
Subject 5 believes that her imagery usage in dance classes has increased and become more detailed over time. She claims to have more control over creating images and identifies life experience as the primary explanation for her ability. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue. Subject 5 found it interesting to talk about imagery because she realizes that she's been doing it all along, but has never analyzed it before.	Subject 6 believes that the content of her imagery has not changed much over time, but that she has much more control over her imagery practice now than in the past. She has increased sensory stimulus. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue. She predicts that her imagery library will continue to grow and become more detailed in the future.

Subjects: HIGH IMAGERS/DIVERGERS

Subject 7	Subject 8
Interview 1	**Interview 1**
Subject 7 has been dancing for more than 12 years and primarily identifies with ballet and jazz. Though she does not claim that she was especially imaginative as child, and though she does not characterize herself as highly imaginative today, she can recall specific instances when she as encouraged to use imagery in ballet and modern classes. Most of the time, she responded to cues from her teachers, but occasionally she thought to image on her own. She was aware of imagery when she was younger, but she did not understand why it was important until much later. Her dance teachers were very important in the development of her imagery ability because she received more exposure from them than other teachers in school.	Subject 8 has danced on and off for about 15 years and primarily identifies with modern dance. He does not believe that he was highly imaginative as a child, and he hesitates to characterize himself as imaginative today. He first began to use imagery as a memorization tool for learning. He believes that he was taught how to image, but not necessarily by exposure from dance teachers. In fact, he doesn't remember a dance teacher using the term "imagery" or explaining why imagery cues were given in his early dance training. He doesn't think that his dance teachers played much of a role in his ability to image. Much of his imagery training came from books to increase memory and sports coaches.
Interview 2	**Interview 2**
Subject 7 scored a 56 on the MIQ-R and considers herself a strong imager. Though it is sometimes difficult for her to recall images, she claims to image a couple times a day. She can image independently if she's using an image that she has seen or felt many times before. She is also able to respond to new cues given by teachers. Generally, she images from an internal perspective. She doesn't have a preference for direct or metaphoric imagery because both types have worked equally well. Her images are generally static, and lack vivid details. She uses imagery primarily as a memory aid. She prefers teachers who use a lot of imagery and a variety of types.	Subject 8 scored a 55 out of 56 on the MIQ-R, but hesitates to overtly declare that he is a strong imager. He doesn't know if he images every day, mostly because he spends most of his class time thinking about combination sequences. He cannot use imagery right away with new movement – he has to get it in his body before he can picture an image of what it looks like. He claims that most of his imagery is conjured independently. His images are fleeting. He uses imagery as a memory aid and as a way to find kinesthetic feelings. He likes teachers who use a lot of imagery and a variety of types, especially since he is still figuring out how he best learns.
Interview 3	**Interview 3**
Subject 7 cannot readily identify concrete changes in her imagery practice over time, however, she believes that she has become more adept at layering and integrating multiple images simultaneously. She believes that her imagery response is generally manifested physically, and therefore, a teacher knows when she responds well to an imagery cue. She believes that her exposure to imagery has made her faster at both picking up imagery, and picking up dance technique.	Subject 8 has observed an increase of personal imagery usage when taking dance classes. He believes that he has more control over his imagery now than in the past and that he is now more able to feel kinesthetic imagery. He believes that his imagery response is generally manifested physically, and therefore, a teacher knows when he responds well to an imagery cue. He is uncertain if imagery has influenced his ability dance, but he is quick to suggest that it has influenced his ability to learn dance.

Three major themes emerged from these interviews: 1) Subjects identified their imaging selves. 2) Subjects characterized their imagery use. 3) Subjects identified the importance of imagery use for their learning. These themes are perhaps best made apparent in the subjects' own words, therefore, direct quotations are provided as often as possible.

Identifying the Imaging Self

All of the participants, both high and low imagers as determined by the MIQ-R, were able to identify themselves as imagers. For two subjects, imagery was not just a mode of dance teaching or learning, it was a part of life. Subject 6, a high imager and an Accomodator explained, "I think that I've always imaged naturally. I think that a lot of creative people do. I think it's kind of part of your inner tape that's playing all the time." Subject 6 also explained that her teachers, most specifically her dance teachers, only taught her how to recognize images, not how to image. Likewise, Subject 3, a low imager and a Diverger, explained the pervasive role of imagery in her life. When asked why she images, Subject 3 replied, "Well, why do you breathe? I don't know. It just seems like, you know, that's what you do. I don't think about doing it – I just do it."

Contrary to Subject 6's confidence in her natural imagery ability, the other three high imagers interviewed expressed a reservation in claiming their high imagery abilities. When asked if he would consider himself a strong imager, Subject 8, a high imager and a Diverger, said, "I don't know if I could say strong, but maybe partially." This quotation illustrates a recurring disconnect between the high and low delineation of

the survey scores and the subjects' perception of their imaging selves as revealed in the interviews. Three out of the four high imagers hesitated to identify themselves as highly imaginative and underplayed their abilities, while all four of the low imagers heartily proclaimed their abilities to generate and manipulate mental images. Possible explanations for this disconnect will be detailed in the Discussion section below.

Characterizing Imagery Use

The eight case studies showed many similarities and many differences in their individual imagery uses. A brief summary of these similarities and differences is catalogued below. The terms and themes in this report were introduced by the researcher's questioning in the interviews.

- Three high imagers (Accomodator, Accomodator, Diverger) and one low imager (Accomodator) reported a preference for metaphoric imagery, that is, imagery that relates to an external object or idea. One High Imager (D) and one low imager (D) reported a preference for direct imagery, such as images of actual body parts or movements. One low imager (A) declared that she had no preference for direct or metaphoric imagery, while another low imager (D) said that she probably preferred direct imagery but responded equally well to the metaphoric cues given by teachers.

- All four high imagers (A, A, D, D) and two low imagers (D, D) reported that they most often imaged from an internal perspective, or a first person point of

view. Two low imagers (A, A) reported that they most often imaged from an external perspective, or a third person point of view.

- Two high imagers (A, D) and three low imagers (A, A, D) declared that their images were usually static, while two high imagers (A, D) and one low imager (D) declared that their images were moving.

- The high imagers explicitly stated that both their sight and touch senses were engaged in imagery, while the low imagers claimed that their imagery usually engaged the sight sense only.

- Two high imagers (A, A) and three low imagers (A, A, D) described their images as vivid or colorful.

- All of the subjects commented that they preferred that teachers use some level of detail when cuing with imagery in the dance classroom.

Though the interviews did not suggest any significant differences in imagery use according to learning style, the interviews did reveal one major difference between the high and low imagers. All four of the high imagers stated that their dance backgrounds included much exposure to imagery and encouragement to use imagery from their dance teachers, while the low imagers stated that their dance teachers used some imagery, but imagery was more prevalent in contexts outside of dance classrooms. Subjects 1 and 3, low imagers, explicitly stated that imagery was not as much a part of their early dance education as it was a part of their visual arts education. Subject 3 explained:

> I think it's interesting that in dance I don't do the imagery as much, and I think that maybe my background in it was more, you know, was less imagery. So

when I dance, I'm more concentrating on doing it right and it feeling right. I think then it loses the imaginative aspect of it. So I think that's my weakness as a dancer – that kind of lack of life. You know what I mean? I think the technique's there, but that the life doesn't – it loses it – because outside, in my art, the life is totally there.

When asked about the role her early dance teachers played in the development of her imagery ability, Subject 3, low imager, said, "You know, it's funny, because I would kind of say very little. I think of my imagery ability in a separate context from dance. It's just that I do it more in other elements." Similarly, Subject 2, a low imager, stated that imagery was more a part of her sports education than her dance education. When asked about the role her early teachers played in her imagery development, she said, "Probably kind of a medium – probably because it was kind of like an introductory role that it can be used in dance. It wasn't necessarily really important to them. It was kind of just something to throw out there." These sentiments are in direct contrast to the high imagers, who generally agreed that their dance teachers played a large role in the development of their imagery abilities. Subject 6, for example, confidently declared that her dance teacher's role was "very, very, very important."

Despite this glaring difference in the backgrounds of high and low imagers, many of the subjects, both high and low imagers, commented that they are becoming increasingly aware of imagery in their dance studies. Subject 1 detailed the evolution of her use, "I might have used imagery – I'm sure I did – when I was young. I just really don't remember it that well. So I'd probably say now is really when I can think of seeing images in my head. When I first started, I didn't know enough to be able to do that. Now I'm definitely more knowledgeable. It's easier for me to do it." Likewise,

Subject 3 explained, "I think I'm way more aware of it. I think that just being conscious of how it's operating might teach me something about myself and about the way I dance. … I think that I'm just going to enjoy it more actually."

Identifying the Importance of Imagery for the Learning Self

While several of the case study subjects indicated that imagery was mainly a means of entertainment in their youth, all of the subjects recognized the importance of imagery as a learning tool in their current learning environments. All eight subjects asserted that a dance teacher knows when they respond well to an imagery cue because a successful imagery response results in a physical change. When asked why she uses imagery today, Subject 7 explained, "A lot of people are visual, and as dancers, we're also kinesthetic. To use imagery, you kind of integrate the two because you're using something visual to create something kinesthetic." In response to the same question, Subject 4 explained, "It gets your mind thinking. You're trying to use an image to understand it. So you're trying to think outside the box, and you usually are. You're developing a different understanding and looking at different views. Therefore, the concept develops." When asked if she thought that imagery was effective as a learning tool, Subject 5 said, "I think it gets the point across for the teacher, but it also gives the student something to relate to more clearly." Subject 3 articulated a similar sentiment, "Well, I think it seems like an obvious way to convey knowledge in a sensory way. You can't exactly make a person's body feel what you want it to feel, but by providing an image, it kind of makes a link so that the person can feel it through that imagery."

While all subjects noted the value of imagery in learning movement, feeling alignment and qualities of movement, and memorizing sequences, Subject 6 specified another important function of imagery: making dance fun. She said, "It has completely improved my dancing ability. It inspires me to think of other images all of the time. And I think it's kind of a creative process. I think it's good for everybody. It does make me laugh sometimes, and that's a good thing in dance class when everyone's tense." Over the course of the three interviews, several of the case study subjects independently added how satisfying it was to analyze something that they've never thought about before – something that they had considered "natural."

Discussion

Because this research design, data collection, and analysis have been filtered through the lens of my own experience, I would like to begin this discussion by identifying myself as a researcher and imager in order to expose my personal biases and to contextualize the following interpretation of the research. My interest in this subject began as an undergraduate student at UCLA. Though not a dance major, I enrolled in several dance classes while I was there and was consistently struck by the instructors' imagery use. I wondered, why do I respond so well to these imagery cues? Do my peers respond to imagery as well as I do? Do they respond in the same way that I do? As I began my research in this field several years ago, I found another connection to my interest in imagery in my personal history. As a Clinician in the tutoring services at Lindamood-Bell Learning Processes in New York and San Francisco, I was taught to

develop an imagery practice in our students in order to facilitate growth in reading, spelling, math, and reading comprehension. Upon reflection, it became apparent to me that imagery has permeated every major part and period of my life. In recent years, I have consciously worked to improve my imaging ability for use as a student in dance classrooms and as a performer, and I have made a concerted effort to integrate imagery cues into the dance technique classes that I teach. It is with this respect for imagery and the desire to learn more about it that I approached this study.

Since the highest imagers in this study share a preference for Concrete Experience, or "feeling," in the information-gathering stage of learning according to Kolb's Learning Style Inventory, it may be inferred that imagery, though seemingly abstract and conceptual, is in fact an attempt to create a concrete experience for the mover. When teachers provide imagery cues, are they essentially promoting a learning situation that concretely relates to experiences with things, people, and feelings? While this seems entirely conceivable, it is important to note that the high imagers were not the only ones who showed a preference for Concrete Experience. Seven of the 30 imagers who averaged scores greater than 5 out of 7 on the MIQ-R preferred gathering information by "thinking." However, 23 of the 30 imagers who averaged scores greater than 5 were "feelers."

Early exposure to imagery from dance teachers may be the best explanation for why some dance students have higher imagery abilities than others, as all four high imager case studies reported high imagery content material in their early dance classrooms, while their low imager counterparts could not. This sheds new light on

Nordin and Cumming's (2006b) findings that advanced dancers demonstrate high imagery ability. The eight case study subjects had similar backgrounds in dance training. Each has been dancing for ten years or more, and has spent significant time training in both modern and ballet idioms. Because their backgrounds are similar, we may hypothesize that they would have had seemingly equal chances to be exposed to imagery and to develop an imagery ability. The differences in instruction by different teachers may be the discriminating factor in the development of different imagery abilities. Early exposure to imagery in dance classrooms may also explain the disconnect between the high and low imagers' scores and their perceived abilities. Though their imagery abilities were defined as low in a dance-learning environment by the MIQ-R, the low imagers may have identified themselves as strong imagers in the interviews because their imagery abilities may be high in other contexts due to more exposure to early imagery use in areas outside of dance education, such as in art classes or sports, as Subjects 1, 2, and 3 suggested. Also, though researchers can determine subjects within a study as High or Low Imagers relative to the sample group, there seems to be no standard score across studies that categorizes an imager as high or low.

It appears that "feeling" learners predominated in this dance sample. This is in high contrast to reports on learners from more conceptual and less movement-based disciplines. Sixty-nine percent of 900 undergraduate geography students (Healey, Kneale, and Bradbeer 2005) and 77% of 94 physical therapy students (Wessel and Williams 2004), for example, favor "thinking" over "feeling" when it comes to gathering information as part of the learning process. It is therefore notable that the LSI-

3 showed that certain learners are more inclined to pursue a course of intermediate dance than other types of learners. The Divergers and Accomodators significantly outnumbered the Convergers and Assimilators in this sample. The intermediate-level dance learners in this sample group showed an overwhelming preference for "feeling" over "thinking" when gathering information. Based on these results, it is reasonable to suggest that learners who gravitate to other movement-based environments, such as high-level athletics and physical education as a career aspiration may demonstrate similar tendencies.

This information may have important implications for dance teachers' pedagogic tactics. If advanced-level dance ability is associated with a high imagery ability as Nordin and Cumming suggest (2006b), then it is our responsibility as teachers to help our learners develop a high imagery ability. If the results of the learning style assessment in this study are in any way representative of other dance classrooms, then, as teachers, we might consider how our imagery cues can cater to the learners who prefer "feeling" when gathering information, for those learners may make up the largest portion of our classroom population.

More information on the intersection of imagery ability, imagery use, and learning style could be gathered in future studies by conducting the same research with a sample of advanced dancers. Since Nordin and Cumming (2006b) have suggested that advanced dancers have high imagery abilities, it would be interesting to determine if advanced dancers' learning styles cluster in the concrete or "feeling" dimension. It might also prove interesting to measure imagery abilities in areas outside of dance to

determine if abilities in movement imagery and conceptual imagery can de discretely distinguished.

The significance of this research is rooted in its contribution to the existing body of knowledge on imagery use in dance classrooms. First, this research provides confirmation that this sample of dance learners is made up of relatively high imagers. Even those imagers deemed "low" were only categorized as such in relation to the high imagers of this study, for even the low imagers reported some ease when it comes to imaging movement. Second, this research suggests that the dance learners in this sample largely share an affinity for "feeling" as they gather information as part of the learning process. If this is found to be generalizable, it would indicate that dancers generally engage their intuition and emotional core as they are learning in the studio classroom. Third, this research evinces the benefit of early exposure to imagery in dance training. The high imagers interviewed in this sample were able to recall early experiences with imagery in their dance classrooms while the low imagers were not. Though the low imagers interviewed in this research proclaimed higher imagery use and ability than their scores on the MIQ-R demonstrated, this disconnect may be explained by early experiences with imagery in contexts outside of dance. This research is perhaps most significant, though, for its evidential support for imagery as a pedagogic tactic. If, as these findings suggest, intermediate dance learners gather information predominantly in the "feeling" dimension, and if these concrete learners tend to be high imagers, then movement imagery may be an uncommonly potent pedagogic tactic for communicating with intermediate dancers.

CHAPTER IV

CONCLUDING SUMMARY

Because this research design, data collection, and analysis have been filtered

through the lens of my own experience, I would like to begin this discussion by

identifying myself as a researcher and imager in order to expose my personal biases and

to contextualize the following interpretation of the research. My interest in this subject

began as an undergraduate student at UCLA. Though not a dance major, I enrolled in

several dance classes while I was there and was consistently struck by the instructors'

imagery use. I wondered, why do I respond so well to these imagery cues? Do my peers

respond to imagery as well as I do? Do they respond in the same way that I do? As I

began my research in this field several years ago, I found another connection to my

interest in imagery in my personal history. As a Clinician in the tutoring services at

Lindamood-Bell Learning Processes in New York and San Francisco, I was taught to

develop an imagery practice in our students in order to facilitate growth in reading,

spelling, math, and reading comprehension. Upon reflection, it became apparent to me

that imagery has permeated every major part and period of my life. In recent years, I

have consciously worked to improve my imaging ability for use as a student in dance

classrooms and as a performer, and I have made a concerted effort to integrate imagery

cues into the dance technique classes that I teach. It is with this respect for imagery and the desire to learn more about it that I approached this study.

Since the highest imagers in this study share a preference for Concrete Experience, or "feeling," in the information-gathering stage of learning according to Kolb's Learning Style Inventory, it may be inferred that imagery, though seemingly abstract and conceptual, is in fact an attempt to create a concrete experience for the mover. When teachers provide imagery cues, are they essentially promoting a learning situation that concretely relates to experiences with things, people, and feelings? While this seems entirely conceivable, it is important to note that the high imagers were not the only ones who showed a preference for Concrete Experience. Seven of the 30 imagers who averaged scores greater than 5 out of 7 on the MIQ-R preferred gathering information by "thinking." However, 23 of the 30 imagers who averaged scores greater than 5 were "feelers."

Early exposure to imagery from dance teachers may be the best explanation for why some dance students have higher imagery abilities than others, as all four high imager case studies reported high imagery content material in their early dance classrooms, while their low imager counterparts could not. This sheds new light on Nordin and Cumming's (2006b) findings that advanced dancers demonstrate high imagery ability. The eight case study subjects had similar backgrounds in dance training. Each has been dancing for ten years or more, and has spent significant time training in both modern and ballet idioms. Because their backgrounds are similar, we may hypothesize that they would have had seemingly equal chances to be exposed to

imagery and to develop an imagery ability. The differences in instruction by different teachers may be the discriminating factor in the development of different imagery abilities. Early exposure to imagery in dance classrooms may also explain the disconnect between the high and low imagers' scores and their perceived abilities. Though their imagery abilities were defined as low in a dance-learning environment by the MIQ-R, the low imagers may have identified themselves as strong imagers in the interviews because their imagery abilities may be high in other contexts due to more exposure to early imagery use in areas outside of dance education, such as in art classes or sports, as Subjects 1, 2, and 3 suggested. Also, though researchers can determine subjects within a study as High or Low Imagers relative to the sample group, there seems to be no standard score across studies that categorizes an imager as high or low.

It appears that "feeling" learners predominated in this dance sample. This is in high contrast to reports on learners from more conceptual and less movement-based disciplines. Sixty-nine percent of 900 undergraduate geography students (Healey, Kneale, and Bradbeer 2005) and 77% of 94 physical therapy students (Wessel and Williams 2004), for example, favor "thinking" over "feeling" when it comes to gathering information as part of the learning process. It is therefore notable that the LSI-3 showed that certain learners are more inclined to pursue a course of intermediate dance than other types of learners. The Divergers and Accomodators significantly outnumbered the Convergers and Assimilators in this sample. The intermediate-level dance learners in this sample group showed an overwhelming preference for "feeling" over "thinking" when gathering information. Based on these results, it is reasonable to

suggest that learners who gravitate to other movement-based environments, such as high-level athletics and physical education as a career aspiration may demonstrate similar tendencies.

This information may have important implications for dance teachers' pedagogic tactics. If advanced-level dance ability is associated with a high imagery ability as Nordin and Cumming suggest (2006b), then it is our responsibility as teachers to help our learners develop a high imagery ability. If the results of the learning style assessment in this study are in any way representative of other dance classrooms, then, as teachers, we might consider how our imagery cues can cater to the learners who prefer "feeling" when gathering information, for those learners may make up the largest portion of our classroom population.

More information on the intersection of imagery ability, imagery use, and learning style could be gathered in future studies by conducting the same research with a sample of advanced dancers. Since Nordin and Cumming (2006b) have suggested that advanced dancers have high imagery abilities, it would be interesting to determine if advanced dancers' learning styles cluster in the concrete or "feeling" dimension. It might also prove interesting to measure imagery abilities in areas outside of dance to determine if abilities in movement imagery and conceptual imagery can de discretely distinguished.

The significance of this research is rooted in its contribution to the existing body of knowledge on imagery use in dance classrooms. First, this research provides confirmation that this sample of dance learners is made up of relatively high imagers.

Even those imagers deemed "low" were only categorized as such in relation to the high imagers of this study, for even the low imagers reported some ease when it comes to imaging movement. Second, this research suggests that the dance learners in this sample largely share an affinity for "feeling" as they gather information as part of the learning process. If this is found to be generalizable, it would indicate that dancers generally engage their intuition and emotional core as they are learning in the studio classroom. Third, this research evinces the benefit of early exposure to imagery in dance training. The high imagers interviewed in this sample were able to recall early experiences with imagery in their dance classrooms while the low imagers were not. Though the low imagers interviewed in this research proclaimed higher imagery use and ability than their scores on the MIQ-R demonstrated, this disconnect may be explained by early experiences with imagery in contexts outside of dance. This research is perhaps most significant, though, for its evidential support for imagery as a pedagogic tactic. If, as these findings suggest, intermediate dance learners gather information predominantly in the "feeling" dimension, and if these concrete learners tend to be high imagers, then movement imagery may be an uncommonly potent pedagogic tactic for communicating with intermediate dancers.

APPENDIX A

GLOSSARY OF IMAGERY TERMS AND DANCE EXAMPLES

Cognitive General (CG) Imagery: Imagery that functions as "strategies of play" (Munroe et al. 2000, 120).
Example: Imagine yourself warming up your quadriceps in order to jump higher.

Cognitive Specific (CS) Imagery: Imagery that functions as "the rehearsal of skills" (Munroe et al. 2000, 120).
Example: Imagine yourself doing a perfect *tour jeté*.

Direct Imagery: "A nonverbal representation of an actual movement. Direct imagery may be visual or kinesthetic" (Overby 1990b, 24).
Example: See or feel yourself do a *grand battement*.

External Perspective Imagery: Third-person imagery, such as watching yourself.
Example: Picture yourself on stage from the audience's perspective.

Imagery: A mental representation of an actual visual or kinesthetic event.

Imagery Ability: The capacity or talent to image.

Imagery Efficacy: The belief in the ability of imagery to influence a specific behavior or set of behaviors necessary to obtain a certain outcome.

Imagery Use: Implementation and practice. Imagery use may refer to types of images conjured, frequency of implementation, and decisions regarding when, where, and why to image.

Imagery Vividness: Imagery brightness and clarity.

Indirect (Metaphoric) Imagery: "A metaphorical image indirectly related to a specific movement. An indirect image involves relating some external object or idea which is intended to enhance the quality or execution of movement" (Overby 1990b, 24)
Example: Imagine performing this phrase as if you were in a vat of honey.

Internal Perspective Imagery: First-person imagery, seeing from your own eyes.
Example: Imagine what you would see if you looked down at your feet in

parallel position.

Kinesthetic Imagery: "A nonverbal memory representation of a kinesthetically-comprehended movements. Kinesthetic imagery involves imagining what a movement felt like" (Overby 1990b, 24).

> Example: Imagine the feeling of performing a *pas de chat*. Imagine the feeling of your muscles engaging and your feet pushing off the floor.

Motivational General-Arousal (MG-A) Imagery: Images related to "general physiological arousal and effect" (Munroe et al. 2000, 120).

> Example: Imagine the feeling of your palms sweating as the curtain rises.

Motivational General-Mastery (MG-M) Imagery: Images "associated with being in control, mentally tough, and self-confident" (Munroe et al. 2000, 120).

> Example: Imagine yourself squelching feelings of nervousness before a performance.

Motivational Specific (MS) Imagery: "Imagining goals and the activities necessary to achieve these goals" (Munroe et al. 2000, 120).

> Example: Imagine yourself performing so well that you are offered a contract with a company following the performance.

Visual Imagery: "A nonverbal memory representation of visually-comprehended concrete objects or events. Visual mental imagery involves forming a mental picture" (Overby 1990b, 24).

> Example: Mentally picture yourself performing a *pirouette*. See the preparation in fourth position, the spring into *retiré*, the revolution, and the closing into fifth position.

APPENDIX B

INTERVIEW INSTRUMENT

The interviewer will meet with each subject individually. A written definition of Imagery will be provided for the subject's easy reference throughout the interview. The interview will begin with a brief introduction to the purpose of the research, and the privacy and consensual agreements for the interviews.

The following questions provide a framework for the proposed three-interview series. The questions were designed based on the existing literature and the purpose of this study. The interviewer will only ask additional questions if the subject's response warrants a follow-up question of clarification or tangential steering.

INTERVIEW 1: Early Experiences/Background

How many years have you been dancing?

Do you identify with a specific dance idiom?

What other dance forms or physical activities have you participated in?

Were you an imaginative child?

Do you identify yourself as imaginative today?

Can you think of instances at home or school when you were encouraged to use imagery?

Can you think of instances when a dance teacher encouraged you to use imagery?

When did you first begin to use imagery?

How often did you image?

Why did you first begin to use imagery?

What did you image?

Did you start to image naturally or were you taught?

Have you had a dance teacher that used the term "imagery"?

Have you had a dance teacher that explained why he/she gave imagery cues?

Has there been anyone in your life that has set an example for imagery use?

Describe your formal or informal imagery training.

When you were younger, what role did your dance teacher play in your imagery development?

What helps you to learn best: thinking, watching, feeling, or doing?

Describe your ideal learning situation and environment.

Have you found that you use imagery in non-dance learning contexts?

INTERVIEW 2: Current Contextual Experience

Do you consider yourself a strong imager?

Have you used imagery today?

Describe an image that you've used in the last week.

Do you have a favorite image or an image that you use frequently?

How often do you image?

When do you image?

Do you image independently or do you respond to cues from a teacher?

Can you keep an image for an extended period of time or is it fleeting?

Do you generally image from an internal perspective as if seeing out of your own eyes, or from an eternal perspective as if watching yourself from the outside?

Do you have a preference for metaphoric imagery, that is, imagery that relates to an external object or idea, or direct imagery, such as images of actual movements?

What senses are engaged in your imagery practice?

Are your images static or moving?

Are your images vivid?

Do you experience any difference when you image with your eyes open versus closed?

Do you find that your response to a dance teacher's imagery cue differs if the cue is given fast or detailed fully?

Do you find that your response to a dance teacher's imagery cue differs if the image is simple or complex?

Why do you image today?

Do you talk about imagery with your classmates?

Do you talk about imagery with people outside of your dance class?

Do you believe that imagery is effective? How so?

Do you find that your background knowledge on the cued image affects your image's vividness or effectiveness?

Do you prefer teachers who use a lot of imagery?

Do you prefer teachers who use a variety of imagery types, such as visual, kinesthetic, direct, and metaphoric?

How do you like a dance teacher to deliver instruction?

How do you like non-dance teachers to deliver instruction?

INTERVIEW 3: Integrating Early and Current Contextual Experience

How have your images changed over time?

Do you use imagery more or less frequently now than when you first began dancing?

Have your images become more complex or more simple over time?

Do you image different things now than in the past?

Do you feel like you have more of less control over your images now than in the past?

Do you engage different senses in your imagery now than in the past?

Can you think of an example image that doesn't work for you?

Why do you think your dance teacher uses imagery when teaching?

Do you believe that your dance teacher knows when you respond well to an imagery cue?

How do you think imagery has influenced your ability to dance?

How do you think imagery has influenced your ability to learn dance technique?

How do you think your imagery use will change in the future?

APPENDIX C

EXAMPLE CONSENT FORM
For Participation as Research Interviewee

You are invited to participate in a research study conducted by Gina Bolles, from the University of Oregon Department of Dance. In this study, the researcher hopes to explore the intersection of: 1) the individual's imagery ability, 2) the individual's imagery use in dance training and performance, and 3) the individual's learning style. Results will contribute to a thesis in partial fulfillment of the degree of Master in Fine Arts. You were selected as a possible participant in this study because the results of your Movement Imagery-Questionnaire-Revised and Learning Style Inventory-3 warranted further investigation.

If you decide to participate, you will be engaged in 3 one-on-one interviews with the researcher. Each interview will be audio recorded for later transcription, and will last no longer than one hour. The interviews will be scheduled at a convenient time for both the subject and the researcher in approximately one-week intervals. In a brief fourth meeting, a summary of the interviews will be shown to you for consult on accuracy of intended message. Results may help the researcher to identify which learners best receive and process imagery cues and what factors may contribute to this ability and personal choices of implementation. The research may improve future pedagogic strategies for teachers and learning strategies for students, however, I cannot guarantee that you personally will receive any benefits from this research.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will only be disclosed with your permission. Subject identities will be kept confidential by name coding in all documents. The researcher will have sole access to the interview tapes and transcripts. Following the research period, the interview tapes and code key will be destroyed.

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with the Department of Dance or your grade in this class. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

If you have any questions regarding the research, contact Gina Bolles in the Department of Dance, 161 Gerlinger Annex, 1214 University of Oregon, Eugene, OR 97403, (541) 346-4096. You may also contact Gina's thesis advisor, Steven Chatfield, 161 Gerlinger

Annex, 1214 University of Oregon, Eugene, OR 97403, (541) 346-3385. If you have any questions regarding your rights as a research subject, contact the Office for Protection of Human Subjects, University of Oregon, Eugene, OR 97403, (541) 346-2510. This office oversees the review of research to protect your rights and is not involved with this study.

Your signature indicates that you have read and understand the information provided above, that you are willing to participate, that you may withdraw your consent at any time and discontinue participation without penalty, that you have received a copy of this form, and that you are not waiving any legal claims, rights or remedies.

Print Name

Signature_____

Date _____

APPENDIX D

RAW DATA SCORES FOR QUANTITATIVE STUDY

Subject	CE	RO	AC	AE	Learning Style	MIQ	Kines.	Visual
10	23	32	25	40	Accomodator	56	28	28
15	31	25	22	42	Accomodator	56	28	28
16	16	32	43	29	Assimilator	56	28	28
22	23	23	28	46	Accomodator	56	28	28
36	23	38	23	36	Diverger	56	28	28
9	28	36	22	34	Diverger	55	27	28
39	21	23	40	36	Converger	55	28	27
6	27	25	32	36	Accomodator	54	27	27
14	21	30	32	37	Converger	54	27	27
7	29	19	31	41	Accomodator	53	27	26
19	32	33	17	38	Diverger	53	25	28
23	23	39	27	31	Diverger	53	26	27
5	22	38	25	35	Diverger	52	26	26
25	24	29	25	42	Accomodator	52	25	27
26	37	15	27	41	Accomodator	52	25	27
35	27	35	21	37	Diverger	52	24	28
38	24	39	26	31	Diverger	52	26	26
12	30	33	19	38	Diverger	50	22	28
17	37	28	31	24	Diverger	49	24	25
1	43	22	27	28	Diverger	48	24	24
4	34	18	29	39	Accomodator	47	24	23
34	22	35	39	24	Assimilator	47	20	27
21	27	39	28	26	Diverger	46	26	20
30	23	32	30	35	Diverger	46	20	26
3	31	28	20	41	Accomodator	45	22	23
33	33	39	15	33	Diverger	45	24	21
18	20	25	45	30	Assimilator	44	21	23
20	29	22	28	41	Accomodator	44	17	27
8	17	27	38	38	Converger	42	20	22
32	21	32	32	35	Assimilator	41	20	21
11	30	41	21	28	Diverger	37	15	22
29	35	44	18	23	Diverger	37	19	18
2	31	25	22	42	Accomodator	33	16	17
37	29	26	30	35	Accomodator	30	12	18

REFERENCES

Bokoros, M, M Goldstein, and M Sweeney. 1992. Common factors in five measures of cognitive style. *Current Psychology: Research & Reviews* 11, no. 2: 99-109.

Hall, C. 1985. The measurement of imagery ability. *Human Movement Science* 4, no. 2: 107-118.

Hall, C, and K Martin. 1997. Measuring movement imagery abilities: A revision of the Movement Imagery Questionnaire. *Journal of Mental Imagery* 21, no. 1&2: 143-154.

Healey, M, P Kneale, J Bradbeer. 2005. Learning styles among geography undergraduates: an international comparison. *Area* 37, no. 1:30-42.

Henson, R, and D Hwang, 2002. Variability and prediction of measurement error in Kolb's Learning Style Inventory scores: A reliability generalization study. *Educational and Psychological Measurement* 62, no. 4: 712-727.

Kayes, D.C. 2005. Internal validity and reliability of Kolb's Learning Style Inventory version 3 (1999). *Journal of Business and Psychology* 20, no. 2: 249-257.

Klein, I, A Paradis, J Poline, S Kosslyn, and D Le Bihan. 2000. Transient activity in the human calcarine cortex during visual-mental imagery: An event-related fMRI study. *Journal of Cognitive Neuroscience* 12, supplement no. 2: 15-23.

Kolb, D. 1984. *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. 2007. Kolb Learning Style Inventory: LSI workbook, version 3.1. Experience Based Learning Systems, Inc., Hay Group.

Kunzendorf, R, and S Hall. 2001. Electroretinographic after-effects of visual imaging: Individual differences in imagery vividness and reality testing. *Journal of Mental Imagery* 25, no. 3&4: 79-92.

Marshall, M, and G Rossman. 1995. *Designing Qualitative Research*. 2d ed. Thousand Oaks: SAGE Publications, Inc.

McNamara, J. 1999 . Dance in the hermeneutic circle. In *Researching Dance: Evolving Modes of Inquiry*, ed. Sondra Horton Fraleigh and Penelope Hanstein, 162-187. Pittsburgh, PA: University of Pittsburgh Press.

Minton, S. 1996. Assessment of the use of imagery in the dance classroom. *Impulse* 4, no. 4: 276-292.

Munroe, K, P Giacobbi Jr., C Hall, and R Weinberg. 2000. The four Ws of imagery use: Where, when , why, and what. *The Sport Psychologist* 14, no. 2: 119-137.

Nordin, S, and J Cumming. 2006a. The development of imagery in dance: Part I: Qualitative findings from professional dancers. *Journal of Dance Medicine & Science* 10, no. 1&2: 21-27.

Nordin, S, and J Cumming. 2006b. The development of imagery in dance: Part II: Quantitative findings from a mixed sample of dancers. *Journal of Dance Medicine & Science* 10, no. 1&2: 28-34.

O'Halloran, A, and L Gauvin. 1994. The role of preferred cognitive style in the effectiveness of imagery training. *International Journal of Sport Psychology* 25, no. 1: 19-31.

Overby, L. 1990a. A comparison of novice and experienced dancers' imagery ability. *Journal of Mental Imagery* 14, no. 3 & 4: 173-184.

Overby, L. 1990b. The use of imagery by dance teachers – Development and implementation of two research instruments. *Journal of Physical Education, Recreation & Dance* 61, no. 2: 24-27.

Paivio, A. 1985. Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Science* 10, no. 4: 22s-28s.

Rodgers, W, C Hall, and E Buckolz. 1991. The effect of an imagery training program on imagery ability, imagery use, and figure skating performance. *Journal of Sport Psychology* 3: 109-125.

Seidman, I. 1998. *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*. 2d ed. New York: Teachers College Press.

Short, S, A Tenute, and D Feltz. 2005. Imagery use in sport: Mediational effects for efficacy. *Journal of Sports Sciences* 23, no. 9: 951-960.

Van Manen, M. 1990. *Researching the Lived Experience*. Washington, DC: Human Science for an Action Sensitive Pedagogy.

Wessel, J, and R Williams. 2004. Critical thinking and learning styles of students in a problem-based, master's entry-level physical therapy program. *Physiotherapy Theory and Practice* 20:79-89.