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Rhythmic Movements and Feeling States

Melanie Johnson
mjohns42@lesley.edu

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RHYTHMIC MOVEMENTS AND FEELING STATES

A DISSERTATION

(Submitted by)

MELANIE R. JOHNSON

In partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

LESLEY UNIVERSITY
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Lesley University
 Graduate School of Arts & Social Sciences
 Ph.D. in Expressive Therapies Program

DISSERTATION APPROVAL FORM

Student's Name: _____ MELANIE R. JOHNSON _____

Dissertation Title: RHYTHMIC MOVEMENTS AND FEELING STATES

Approvals

In the judgment of the following signatories, this Dissertation meets the academic standards that have been established for the Doctor of Philosophy degree.

Dissertation Committee Chairperson: _____ *Robyn Cruz* 4/2/18

Robyn Cruz (date)

Internal Committee Member: _____ *Michaela Kirby* 4/10/18

Michaela Kirby (date)

External Committee Member: _____ *Nisha* 4/10/2018

Nisha Sajnani (date)

Director of the Ph.D. Program/External Examiner: _____ *Michele Forinash* 4.10.18

Michele Forinash (date)

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate School of Arts and Social Sciences.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

_____ *Robyn Cruz*

Dissertation Director

I hereby accept the recommendation of the Dissertation Committee and its Chairperson.

_____ *Debra*

Dean, Graduate School of Arts and Social Sciences

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A handwritten signature in black ink, written over a horizontal line. The signature is highly stylized and cursive, appearing to read 'M. J. [unclear]'. The ink is black and the background is white.

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ABSTRACT

This study was conducted to test the validity of a theoretical framework in developmental psychology of body movement analysis, the Kestenberg Movement Profile (KMP). Motor patterns associated with needs and foundations for affect expression, the tension flow rhythms (TFRs), were examined. Recent research examined the validity of the TFRs in nonclinical adults and found preliminary support for some of the KMP's assumptions associating smooth (indulging) rhythms with indulgent affects and sharp (fighting) movements with assertive or aggressive affects. This study aimed to test the TFRs associated with the first two years of development—the sucking, biting, twisting, and strain/release rhythms. The sucking and biting rhythms are associated with the first year of life and the twisting rhythms are associated with the second year of life. The guiding hypotheses for this study were that adults embodying four different TFRs (two smooth- and two sharp-quality) different affects between each of the four TFRs; and would experience different affects within the two categories, indulging and fighting. Fifty-three adults, ages 18-80 participated in the study. Each person enacted four TFRs and completed a survey after each movement to indicate how they felt after enacting that movement. Six of the participants were interviewed about their experiences. Each participant also completed an electronic test of emotional self-awareness. Statistical analyses showed support for both hypotheses. Participants reported different qualities of indulgent affects when engaging in the indulging TFRs and different qualities of assertive affects when engaging in the fighting TFRs ($p < .05$). Indulging and fighting categories were rated to be associated with indulgent and fighting-quality affects, respectively ($p < .05$). One major theme was the complexity of responses these movements can elicit.

Two sub-themes were: memories stimulated, and the strength of response to the sucking rhythm within each of the participants. These findings point to initial support for the KMP's taxonomy of rhythmic movement and its differentiation between feeling states associated with different rhythmic movements. Dance/movement and body-oriented therapists who incorporate rhythmic movement in their approaches may benefit from this knowledge, as well as expressive therapists who incorporate rhythm in facilitating affect change. This study also contributes to the need for research into the validity of the movement assessment instruments in dance/movement therapy, a burgeoning clinical field necessitating empirical investigations to legitimize its theoretical perspectives.

CHAPTER 1

Introduction

The Kestenberg Movement Profile (KMP) is a theoretical framework of psychomotor development that is a system of observing, notating, quantifying, and interpreting human body movement. The KMP theory explicates psychological interpretations of nine different movement patterns observed to correlate with the following concepts: needs and drives, temperament, learning styles and defense mechanisms, coping skills, self-esteem/self-concept, and relational expression and development. Developed by psychiatrist Dr. Judith Kestenberg (1967; Kestenberg & Sossin, 1979) and the Sands Point Study group, KMP is an integration of Ana Freud's meta-psychological model and Rudolph Laban's movement analysis system. This study investigated the KMP movement patterns associated with needs and drives, the tension flow rhythms (TFRs), to test the validity of these psychological constructs with which the TFR movement patterns are theoretically associated (Kestenberg-Amighi, Loman, Lewis, & Sossin, 1999). The study aimed to investigate the KMP's interpretation of these early developmental movement patterns to ascertain the theory's validity in a group of adults. A description of the history of the KMP will be presented to provide historical and cultural context. Judith Kestenberg (1910-1999) was a Polish psychiatrist and psychoanalyst who emigrated to the United States to study child psychiatry in 1937. Her interests were in studying children and, in particular, studying the impact of the Holocaust on child and adult survivors (Kestenberg & Brenner, 1996). In her studies of children, Kestenberg was primarily interested in their nonverbal behavior and sought to conceptualize what children were communicating through their nonverbal behavior.

Kestenberg espoused a primary prevention approach to child development and, in addition to coding movement patterns and connecting those patterns to psychoanalytic theory, she also developed verbal and nonverbal interventions to support meeting a child's needs and also the needs of the mother or caregiver (Loman, 2016). Some of these interventions included ways to manually support children as they progress through sequential psychomotor phases, as well as teaching pregnant women how to attune to the rhythms of the fetus to get to know their child before birth. Kestenberg studied the work of Rudolph Laban (Laban, 1966; 1960; Laban & Lawrence, 1947) and his system of movement analysis to frame her understanding of child development. She reported, however, that children's movements are not reflective of mastery as adult movements are, thus Laban's theory limited the scope of explanation of movements in early development. Collaborating with Laban student Warren Lamb (1965), Kestenberg expanded Laban's theory to conceive of the flow of muscle tension in body dynamics and in body contours (shape) to be reflections of an individual's ego development and relational development:

Rhythms of tension-flow are sequences of fluency and restraint in the state of the muscles in various parts of the body. They are apparatus for discharge of drives through motor channels. Rhythms of shape-flow organize the relationship of body parts in such a way that drives can be satisfied in transactions with objects. In successive developmental phases regulations of tension-flow and shape-flow come under the control of the ego. Regulation of tension-flow aids drive differentiation; regulation of shape-flow contributes to the differentiation of self and objects.

(Kestenberg, 1967, p. 86)

Kestenberg began making qualitative observations and identified patterns of children's movement in the early years of development at her Center for Parents and Children in Sands Point, New York. Kestenberg started to mimic the movements she observed in infants and children and put those movements on paper in hand written form. She noted thematic patterns in the lines of movement drawings in different ages of children she observed. This process of attunement to the child's movement was described by Kestenberg as the matching of muscle tension and relaxation (Kestenberg, 1965a). The variations in alternations between muscle tension and relaxation were described by the researchers as tension flow. Given that these movements showed a repetitive quality, they were identified as rhythmic in nature and thus the movements were identified as TFRs. Using psychoanalytic theory to interpret these movements, Kestenberg and colleagues observed these rhythmic actions to occur when an infant or child was engaging in an action to serve a biological need, such as taking in food (Kestenberg Amighi et al., 1999; Kestenberg, 1975). Given that psychoanalytic theory was the primary framework at the time of the KMP's inception, the movement patterns were correlated with Ana Freud's meta-psychological model (Kestenberg, Marcus, Robbins, Berlowe, & Buelte, 1971; Sossin, 2007). Kestenberg found validation of her interpretations based on blind comparisons of KMP profiles compared to the Hempstead Developmental Profiles created by Anna Freud. These biologically-derived movements were correlated, then, with the developmental attainments described by psychoanalytic theory. Though the theoretical interpretation originated in psychodynamic orientations of the time of its creation, the developers of the KMP assert that at the core of the theory are patterns that can be identified and described using non-psychoanalytically oriented

language and those descriptions can be compatible with other psychological theoretical frameworks (Kestenberg Amighi et al., 1999; Loman, 1998).

Kestenberg's original work was later developed to function as a comprehensive nonverbal clinical assessment tool for children, adolescents, and adults. In a KMP profile, frequency distributions can be created so that a person's movement repertoire can be visualized (Loman, 2017). As a strength-based and primary prevention model, the KMP serves primarily as a descriptive tool of movement patterns observed in an individual. However, the model also offers qualitative evaluative descriptions of each of the movement patterns and details their functional uses and adaptive qualities. These descriptions are an integration of psychoanalytic theory, object relations theory, Margaret Mahler's (1963) psychoanalytic approaches to nonverbal development, and Erikson's developmental theory (Kestenberg, 1975; Kestenberg Amighi et al., 1999). Theories of movement analysis by Warren Lamb (Lamb, 1965; Lamb & Watson, 1987) and Irmgard Bartenieff (Lomax, Bartenieff, & Paulay, 1969), pioneering movement analysts and students of Rudolph Laban (1960, 1947; Laban & Lawrence, 1947), contributed to the movement assessment concepts and language used by the KMP (Kestenberg Amighi et al., 1999). Conceived within a Western cultural context, KMP theory has been researched within the United States and around the world. Several studies examining and supporting its utility cross-culturally have been conducted and will be detailed later in this dissertation.

The KMP serves as one of a few clinical assessment tools used primarily in dance/movement therapy, a body-oriented psychotherapy discipline and specialization within the creative arts, or expressive, therapies (Cruz & Berrol, 2012; Cruz, Feder, Betts,

& Wheeler, 2013; Levy, 2005; Loman & Sossin, 2009). The KMP is also a tool for research, especially in nonverbal studies of infant-parent dyads though other studies have examined its use with adults (Koch, 2007, 2014, Koch, Fuchs, & Summa, 2014; Koch & Helena, 2017). In addition to being taught in psychomotor assessment courses in graduate programs in the US, KMP trainings for educators, therapists, parents, clinicians, and researchers are continuously offered around the world. Students who have taken the full introductory KMP course complete a practice KMP profile for an individual. To become certified as a KMP analyst, one must have completed the introductory course and practice profile, and then independently complete a second KMP profile of a pre-determined videoed observation. A group of KMP experts then works with the applicant to ensure results reliability before certification can be completed (“Certification Program”, n.d.).

Becoming a KMP analyst is certainly not mandatory to apply the theoretical information. Used solely as a lens through which to conceptualize development, individual strengths and challenges and/or dyadic dynamics and strengths the KMP can be a resource and guiding viewpoint that is also compatible with many theoretical orientations (Kestenberg Amighi et al., 1999). A psychoanalytic worldview is not mandatory to employ knowledge supplied by KMP theory. Intended foremost as a descriptive tool, the KMP was intended to serve as a nonjudgmental language for translating all patterns of movement throughout the lifespan, and not those patterns limited to specific groups of people or age ranges.

Since the KMP not only presents theoretical descriptions of developmental movement patterns but also details interpretations of those movement patterns (Kestenberg & Sossin, 1979), it is fitting to examine the validity of those interpretations.

Mental health practitioners are behooved to conduct their clinical practice using sound, evidence-based practices, especially those in burgeoning fields such as dance/movement therapy, where attention to multicultural issues in describing and assessing clients based on movement observations is paramount (Cruz & Feder, 2013). In comparison to other fields such as music therapy and art therapy, dance/movement therapy literature has considerably fewer studies that empirically investigate its assessment instruments (Cruz & Berrol, 2012).

Purpose of this Study

The purpose of this study is to contribute to the dance/movement therapy assessment literature by examining the theoretical validity of one part of the KMP—the TFRs. The study was inspired by several contributing factors. First, the researcher, a certified KMP analyst and international trainer, was motivated to investigate the theoretical paradigm she employs as a clinician, as well as to support her field of dance/movement therapy with research in the KMP movement assessment theory. Second, there are developmental movement patterns identified by the KMP that are unique to it and not an integration of other movement assessment theories. These patterns have appeared to be scant in the literature and merit investigation. Like all the KMP patterns, the TFRs have specific motoric qualities, represent foundational psychological material, and are assumed to be relevant to psychology across the lifespan (Kestenberg Amighi et al., 1999).

Most of the research into KMP has been conducted in infants and children, with only a handful of studies looking at older groups of people (Kestenberg, 1967; Koch, 2007, 2017; La Barre, 2011; Loman, 1994, 1995; Loman & Foley, 1996; Sossin &

Birklein, 2006). Perhaps it is for this reason that one may mistakenly assume that this developmental theory is solely a child development theory. This study aims to enhance understanding of the KMP theory of TFRs by engaging self-reporting adult participants in the TFRs and reporting their experience.

Assumptions

Several assumptions within the KMP will be acknowledged here. The first is, the body holds memories, including experiences from preverbal periods of development (LeMessurier & Loman, 2008). It further assumes that how a person was treated as a child by primary caregivers can affect the individual intrapsychically and interpersonally. This includes how a child was held as an infant (Romer & Sossin, 1990). Children of depressed mothers often reflect the movement patterns associated with depression, demonstrating the significance of the relationship with the primary caregiver and his or her embodied state. KMP theory assumes that from fetal phases throughout the lifespan, human movements are not random and they reflect cognitive and affective processes associated with individual characteristics and universal self-contingencies (Kestenberg & Borowitz, 1990; Kestenberg, 1987; Loman, 1994). For example, in order to survive, humans require food, elimination of waste, procreation, and relationships. These contingencies at a primary level serve as some basic human needs and can be viewed in similar movement patterns across different groups. These movements occur unconsciously and throughout the lifespan (Kestenberg Amighi et al., 1999).

In addition to detailing a theoretical interpretation of psychomotor development, the KMP can be a tool for clinical intervention (Loman, 1998). A treatment approach using a KMP lens includes evaluating a KMP profile of an individual or between a dyad

to identify where there is an excess or deficiency of singular movement patterns. It can also display individual proclivities to help identify where there may be clashes or points of harmony in a relationship (Loman & Sossin, 2009). KMP profiles can be used as a guide for a practitioner in helping his or her client to integrate movement patterns that may be scarce or excessively occurring. For instance, if an adult client's KMP profile shows an abundance of a particular pattern, one explanation using KMP theory surmises that there could have been a disturbance in the year of development in which that pattern occurred (Kestenberg, 1977a, 1977b; Kestenberg Amighi et al., 1999).

Culture and context are of importance to KMP theory. Interpreting a KMP profile requires that the analyst integrate what is known about the values held by the client as well as those of his or her culture, both in micro- and macro-spheres (Kestenberg Amighi et al., 1999). A KMP analyst acknowledges his or her own cultural biases when conducting interpretations and recognizes that as in any theoretical framework, there are limitations and biases. KMP theory was presented as one possible framework for understanding the complexities of human development and organizing and describing them in a way that introduces a clear description while holding an awareness that other explanations are certainly possible.

Anthropologist and KMP analyst, Janet Kestenberg-Amighi, is the daughter of Judith Kestenberg and a proponent of investigating KMP methodology when making cross-cultural observations of nonverbal behaviors while limiting cultural bias (Kestenberg-Amighi, 2007; 1990). In her early writings on the subject, Kestenberg-Amighi (1990) suggested:

Since [the nine KMP] categories of movement are not culturally recognized categories, but rather unconsciously patterned ways of moving, they are not readily subject to observer effect, observer bias, nor are they particularly context dependent. However, they cover a wide range of behaviors such as ways of relating to space, weight and time, ways of relating to people and objects in the environment, expression of affects, expression of feelings of comfort and discomfort, etc.—all of which can be presented graphically on one page (p. 119).

The author further recommended the observation and written notation of tension flow rhythms in mothers and children as a way to understand attachment patterns and attunement through the use of muscle tension variabilities the tension flow rhythms represent. She concluded that the use of a kinesthetic observation methodology that the KMP offers can facilitate a common language with which anthropologists and psychologists can describe the behavioral observations seen cross-culturally. Then, because of its leniency toward theoretical interpretation, the interpretation of the movement data collected can be at the behest of the researcher.

Tension Flow Rhythms

The movement patterns that, according to KMP theory, reflect primary needs and drives, and that serve as a foundation for affective states, are called the TFRs (Kestenberg & Sossin, 1975). The TFRs are repeated motor movements that facilitate meeting one's primary biological needs and that reflect psychological correspondences to each of those needs (Kestenberg Amighi et al., 1999). In the KMP there are 10 TFRs that occur developmentally reflecting the primary biopsychological focus of each of the first five

years of human development. In each year of life, there are two TFRs that are most predominant—one of which has a smooth, or indulging, quality and one has a sharp/more intensive, or fighting, quality (Kestenberg, 1967; Loman, 2017).

In the first year of life (ages zero to one), taking in food or nourishment is the primary biological focus and its matched TFR is the sucking rhythm. This movement can be seen when a child takes in food through the breast or bottle and also engages in smooth, repetitive caresses of the mother or caregiver while taking in food. Taking in sensory stimuli or ideas, symbiosis, and self-soothing rocking or touching motions are associated with the sucking rhythm. Then, as teeth begin to develop, the mastication of solid foods becomes a primary focus in order to break down food into parts for easier consumption and digestion. This action is motorically expressed through the biting rhythm, which is also associated with self-differentiation, dividing concepts or ideas into parts, and critical thinking (Kestenberg Amighi et al., 1999).

In the second year of life (ages one to two), expelling of waste is a primary developmental focus and can be seen in passive defecation. A child reflects this activity through the twisting TFR, as seen in examining small objects by rotating the wrists and fingers, or by hiding and peeking in a playful or coy manner. Controlled defecation and toilet training serve as a primary developmental task in this year, as well, and the accompanying TFR is the strain/release rhythm. This rhythm is seen when a child pulls himself or herself up to standing. It can also be seen in holding on to objects, people, or ideas. Control or presenting as controlling can be associated with this rhythm (Kestenberg Amighi et al., 1999).

In the third year of life (ages two to three), children demonstrate movement patterns of aimless wandering or running, and enjoy playing with formless matter such as sand and water. The relationship to time is indulgent and timelessness feels pleasurable. The TFR associated with these phenomena is called the running/drifted rhythm. Biologically, the running/drifted rhythm is marked by passive urination. When a child subsequently develops the skill in controlled urination, it is called the starting/stopping rhythm. This rhythm can be seen in children's play, where games that involve quick starts and stops of movement are most pleasurable. The starting/stopping rhythm can also reflect impatience and being time-oriented (Kestenberg Amighi et al., 1999).

In the fourth year of life (ages three to four) children's movements are most prominently reflecting qualities of nurturing, regardless of gender. The biological development of this age is the stimulation of the reproductive organs. Another phenomenon that can be present in this age is what appears to be behavioral regression in which children sometimes want to be a big boy or girl and sometimes want to be a baby—represented by the swaying rhythm (Kestenberg, 1976; Loman, 2017). It is a developmental period in which the body is undergoing hormonal shift, and since there is no physical product produced by this rhythm (as there was in the previous two years), the sensation of confusion and emptiness can accompany this new experience. Children at this age can also reflect this discomfort through familiar actions such as whining and having prolonged periods of difficulty feeling satisfied and not being able to use words to explain why. The associated TFR is the surging/birthing rhythm. It is represented by children's interest in going through tunnels and even sometimes wanting to move toward their mother's belly (or womb). This is an age where it is possible that children show an

increase in existential awareness, for example in asking ‘why’ questions and becoming curious about or aware of the concept of death (Kestenberg Amighi et al., 1999).

Psychologically, the surging/birthing rhythm is associated with transformational cycles, such as menstruation, creative projects, and deep healing experiences. The fourth year of life is one on which the KMP places attention because of these unique phenomena that are occurring for children and the importance of informing parents as to the typicality of these often frustrating, but normative patterns of early development (Loman, Cellini, Johnson, & Hallett, 2009).

In the fifth year of life (ages four to five) children enter behavior patterns that appear to be outwardly directed. In the jumping TFR, children frequently engage in literal jumping or become interested in attention seeking expression, in the sense of appropriate self-pride and not in the pathological interpretation. This can be seen in children’s enthusiasm to be seen or to have answers to questions readily (Kestenberg Amighi et al., 1999). The final rhythm is called the spurting/ramming TFR. It is seen in children’s desire to engage in assertive or aggressive play. Children may show increased play in the form of rough-housing, sword fighting, or feeling their body crash into a mat or other object. This rhythm serves to integrate one’s sense of self-assertion. If a family culture or surrounding culture tends to favor non-assertive forms of interaction this TFR may appear surprising or frustrating (Loman, 2017). However, KMP theory asserts that an appropriate measure of assertiveness serves a necessary function to an individual and creatively channeling this TFR through safe and fun activities can satisfy a child’s normative drive to feel the impact of their body on the environment (Loman & Sossin, 2009). Allowing for this expression is also theorized to prevent repressing children’s self-

expression and possible increase in aggressive behaviors (Kestenberg Amighi et al., 1999).

The TFRs appear throughout the lifespan in body movement (Kestenberg & Sossin, 1975). For example, the sucking may appear in the form of a smooth head nod or rubbing one's fingers together. The biting rhythm may be seen in using one or two finger tips to tap one's forehead while trying to remember and think of an answer to a question. The twisting rhythm may be seen in hair twirling or moving the tongue around the teeth to remove a sticky substance. The strain/release rhythm can be seen in stooping, throwing, or pushing a heavy object. These are just a sample of the myriad possible iterations of the TFRs in pedestrian movement (Kestenberg Amighi et al., 1999). The KMP website ("Videos," n.d.) provides video examples of each of the 10 TFRs as seen in children's naturally-occurring movement patterns.

Students of the KMP learn that every TFR can be performed in body movements that are repetitive and specific to that TFR (Kestenberg Amighi et al., 1999). Each TFR originates from a biological organ and zone, such as the mouth being the zone to meet the digestive needs of incorporation and ingestion (Kestenberg, 1967). Even though the sucking rhythm may at one time present in the form of a baby sucking on a nipple, the same movement qualities can be seen in the hands in a caress, for example (Loman, 2017). When observing the nursing ritual between a mother and infant, the mutual rhythmic caress of the sucking rhythm reflects intersubjectivity and attunement in the bonding and attachment process (Kestenberg Amighi et al., 1999; Loman, 1994, 2017). So, each rhythm can occur in localized parts of the body and in the body as a whole. A whole-body sucking rhythm would show as a repeated soft bend of the knees, gentle head

nod, body rocking, and/or fingers rubbing together. These rhythmic movements can be performed standing or while seated.

Recent research (Koch, 2014) tested one of the theoretical assumptions of the KMP TFRs, that indulging and fighting rhythms would facilitate different cognitive and affective states in adults who embodied those rhythmic movements—either jumping or spurting/ramming. Results of the study showed significant differences in affective responses (but not cognitive) to the indulging and fighting rhythms. This study's findings are significant for embodiment research because they demonstrate an original way of studying dynamic body movement and its direct effect on psychological processes. This supports the bidirectional notion of body and brain communication (Porges, 2001) as well as the utility of classifying dynamic body movements into indulging and fighting (or smooth and sharp) categories of the KMP. The study's author emphasized the necessity for understanding the meaning of movement, especially in clinical psychology and dynamic body feedback research. Differences between rhythmic movement quality were found to be an important factor in affect response, demonstrating the necessity for further understanding of the differences or similarities between static, postural, movements and dynamic, rhythmic movements.

Based on these original findings, the motivation for this dissertation was to build upon Koch's (2014) findings by designing a partial replication study. This author sought to further Koch's findings by first investigating the theoretical validity of the KMP's interpretation of indulging and fighting rhythm categories and then to test differentiated rhythms within each category and their theoretical interpretations. For example, the KMP interprets the sucking rhythm to be associated with the psychological needs associated

with self-soothing, indulging, and incorporation. Is this, in fact, a valid correspondence? Building on Koch's study serves the need for testing the validity of extant theoretical interpretations and classifications of body movement (Cruz & Berrol, 2012) and for providing understanding about the KMP rhythms in their utility as a guide for dance/movement therapy clinical interventions (Loman & Sossin, 2009).

Research Hypotheses and Questions

There were two hypotheses investigated:

1. There will be different affective states elicited by each of the TFRs tested in an adult group of participants.
2. There will be a difference between affective responses to indulging TFRs and fighting TFRs in an adult group of participants.

In addition to these research questions, the nature of this study includes open-ended narrative data to gather detailed descriptions of how people experienced each of the TFRs that they embodied. Not only was it necessary to have statistical data but also important to make richer meaning of the results with qualitative experiences that would otherwise be lost in the statistical outputs.

Importance to Dance/Movement and Body-Oriented Therapies

It is necessary to investigate the validity of the assessment instruments clinicians employ to track their clinical progress and to initiate appropriate treatment plans. The KMP theory is a clinically-oriented developmental psychology theory that offers many possibilities not only for clinical use but also for use in parenting, education, and research (Kestenberg Amighi et al., 1999). Therefore, its tenets must be empirically investigated for soundness and validity (Cruz & Berrol, 2012). By expanding our understanding of the

relevance of the KMP theory to psychological development, clinicians can have a better understanding of the grounds on which their paradigm is based, thereby fostering credibility to treatment approaches (Cruz & Feder, 2013).

CHAPTER 2

Literature Review

This chapter will first present perspectives on body movement assessment and their prevalence across disciplines. Arguments for dynamic body feedback research will also be described. Next, disciplines that feature movement assessment as a clinical instrument will be described, as well as the argument supporting validation studies of those instruments. The KMP, a theoretical framework for movement assessment, will be presented along with its presence in the research literature. A discussion of rhythm and its focus across disciplines including the creative arts therapies, and in dance/movement therapy in particular, will follow. Finally, research into the measures of rhythmic movement described by the KMP will be discussed to suggest use of KMP perspectives of TFRs within dance/movement and other creative arts therapy practices.

Movement Assessment Across Disciplines

Studies examining how psychomotor processes correlate with various interpretations of self-representation have occurred within anthropology (Birdwhistell, 1970; Darwin, 1872), social psychology (Mehrabian, 1968; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Francois, 2005), and neuropsychiatry (van der Kolk, 2014). These studies appear to focus upon one of three observed elements: body posture, dynamic or changing movement, or localized corporeal expressions (for example, postures, gestures, and subtle expressions). Some studies have investigated the influence of static, or postural, movement on autobiographical memory and goal planning (Dijkstra, Kaschak, & Zwaan, 2007; Zimmermann, Toni, & de Lange, 2013), while others have examined dynamic movement and affect change (Malkina-Pykh, 2012).

Researchers across disciplines have also given theoretical support for studying body posture and psychological processes. Birdwhistell (1970), an anthropologist and pioneer in examining and describing body movement in development and social behavior, supported the theory that nonverbal behavior is a socialized facet of the complex hierarchy of interpersonal communication and is also a significant influencer of the development of verbal language. His conclusions based on research examining smiling behavior in children and adults, and infant-parent interactions, supported the argument for whole-body analysis and understanding of social context for accurate interpretation of smiling behavior. He also concluded that the meaning of body movements is not universal, as different cultures decide the meaning of movements such as a smile.

Ekman's pioneering research alone and with colleagues (Ekman, 1971; Ekman, Friesen, & Ancoli, 1980; Matsumoto & Ekman, 1989), in contrast, explicitly focused on facial expression and emotion recognition, and supplied subsequent studies in social cognition with a facial recognition test, Ekman's 60-Faces Test. The test has been employed in psychiatric and neurologic testing to measure facial expressions paired with six basic emotions (happiness, anger, fear, surprise, disgust, and sadness), and continues to be validated through cross-cultural normative data gathering (Dodich et al., 2014). In other research also exploring micro-expressions, or subtle changes in facial muscle activity, specific expressions have been correlated with emotional states of happiness, surprise, sadness, fear, disgust, contempt, anger, and neutrality; and have been used to predict outcomes of presidential races (Wezowski & Wezowski, 2012).

Another researcher to address nonverbal indices of self-esteem was Brumfitt (Brumfitt, 1999), who developed a measure for self-esteem (Visual Analogue Self-Esteem Scale, VASES) as a response to the lacunae of extant nonverbal measures of this construct. With a focus on aphasic individuals, the author created a 12-card visual of ‘bipolar’ concepts that had been empirically linked to the global conceptualization of self-esteem. Participants were shown cards that contained pictures depicting images of facial expressions and a person interacting with their environment, and then indicated which card best represented how they felt about their self. The VASES has also been used in subsequent research to measure the effects of stroke survival on self-esteem (Vickery, 2006). Thus, nonverbal assessment instruments have been used to measure self-feelings.

Empirical investigation into the relationship between embodied processes and psychological phenomena has also been conducted in areas such as emotion detection (Duclos et al., 1989; James, 1932; Riskind, 1984; Riskind & Gotay, 1982; Winters, 2008) and self-perception (Coopersmith, 1959; Niedenthal et al., 2005). While recent studies have focused on examining the manipulation of body posture as a mechanism for change in self-image reports (Canales, Cordás, Fiquer, Cavalcante, & Moreno, 2010), eating habits (Allen, Gervais, & Smith, 2013), and feelings of personal empowerment (Schubert & Koole, 2009). Cross-cultural comparisons of perceptions of inter- and intrapersonal associations with different body postures have also been made (Kudoh & Matsumoto, 1985).

One research study that received significant public attention indicated that changing one’s body posture not only facilitated change in outcomes of social

interactions but also showed changes in neurochemical measures of stress (Carney, Cuddy, & Yap, 2010). Results of this study advocated use of embodiment processes, such as posture altering, to impact change in social domains of the self—particularly eliciting empowered feelings within the individual and giving others the impression of confidence and assuredness in that individual. Such findings mark the significance of the body and body movement as a mechanism for personal and social change.

Though the aforementioned studies have provided insight into embodied processes and corresponding psychological processes, they often focus on static postural movement or generalized terms such as “expansive” (Huang, 2011). In Germany, Koch’s (2014) research demonstrated not only the significance of dynamic body movement and its effect on perception and affect, but also the utility of employing rhythmic movement descriptions from a movement taxonomy system, the Kestenberg Movement Profile. The general lack of specificity in describing a taxonomy of the movement patterns studied is also a drawback of many of the embodied studies that use generic language. This can make issues of replication challenging. It is also a curiosity that often studies in the psychology of body movement rarely acknowledge extant movement assessment systems, such as those employed by dance/movement and body-oriented therapists (Cruz & Feder, 2013; Shafir, Tsachor, & Welch, 2016). The uniqueness of the KMP as a theoretical framework for human development and also a movement assessment tool that describes dynamic psychomotor activity renders it worthy of further investigation for its validity.

Body Movement Assessment in Dance/Movement Therapy

A basic assumption within dance/movement therapy is that psychomotor activity is inherent within the therapeutic focus among the diversity of clinical populations, ages, cultures, and settings in which dance movement therapists practice (Caldwell, 2013; Cruz, 2009; Cruz & Berrol, 2012; Loman & Foley, 1996). Dance/movement therapy is distinguished by its focus on and use of body language and movement behavior as a psychotherapeutic assessment and intervention tool (American Dance Therapy Association, 2016).

Assessment in dance/movement therapy often draws on the work of Austro-Hungarian choreographer Rudolph Laban, who studied adult movement patterns and suggested that movement qualities occur as effort within dimensions of space, weight, time, and flow (Laban & Lawrence, 1974). Students of Laban, including Warren Lamb, built upon Laban Movement Analysis (LMA) with a system of creating Action Profiles of individuals in order to improve their performance in the work environment (Lamb & Watson, 1979). Irmgard Bartenieff (Bartenieff, Davis, Paulay, Bowness, & Chasins, 1972) developed a system of body movements to facilitate mobility and individual self-expression, based on language from Laban's Effort Shape system and Lamb's Shape Flow terminology. Bartenieff collaborated with Alan Lomax and Forrestine Paulay (Lomax, Bartenieff, & Paulay, 1969) to study several styles of dance around the world to look for stylistic patterns within each dance as representations of each culture's values. Martha Davis (1981) created a movement diagnostic scale called the Movement Psychodiagnostic Inventory (MPI) that identified 60 different movement patterns within mentally ill patients. A short form organized within different categories was specifically

described for identifying movement indicators associated with mental illness. A movement analyst using the MPI determines and codes for the presence or absence of different involuntary movement patterns within specific categories, where a score of zero indicates no significant concern and a score of three points indicates frequency increments (Davis, Lausberg, Cruz, Berger, & Dulicai, 2007). Atypical involuntary motor behaviors associated with mental illness have also been studied using LMA movement descriptions integrated within Davis's MPI (Cruz, 2009) in a pilot study.

Laban's movement analysis system sparked the attention of Judith Kestenberga, a Polish psychiatrist, researcher in infant nonverbal behavior, and student of Warren Lamb. With the Sands Point Study Group, Kestenberga developed the KMP, which is based on Laban's LMA system and Lamb's work (Kestenberga-Amighi, Loman, Lewis, & Sossin, 1999; Kestenberga & Sossin, 1979). Constructed within the theoretical framework of Anna Freud's meta-psychological model (Freud, 1965), Kestenberga's research on infant and child behaviors identified correspondences between particular movements and developmental phases, thus allowing one to assess developmental progress and psychological functioning via nonverbal activity (Kestenberga-Amighi et al., 1999; Kestenberga, 1965a, 1965b, 1967; Lewis & Loman, 1990). The KMP details a perspective on intrapersonal and relational development through observations of both dynamic and postural movement qualities. Some of the movement qualities are Laban-based and some are original to Kestenberga's findings.

The LMA and the KMP are the primary psychomotor assessment tools taught in graduate level dance movement therapy training and applied to psychotherapeutic treatment (Cruz & Feder, 2013; Loman, 1994). Examining the theoretical perspectives of

assessment within dance/movement therapy has been an ongoing necessity for the field (Koch, 2011), and they also remain present but relatively scant across movement and embodied assessment research (Reale, 2011). Since these tools are actively employed within clinical dance/movement therapy, evaluation of validity and reliability of dance therapy movement assessment paradigms and tools is warranted (Koch, 2011).

Kestenberg Movement Profile

Judith Kestenberg and her colleagues at the Sands Point Study Group observed and notated infants' and young children's movements in order to gain understanding of the child's internal state and make meaning of their nonverbal communication (Kestenberg & Buelte, 1977; Sossin, 1987). By imitating infants' body movements, Kestenberg translated these movements by drawing them as she embodied them. She identified predictable movement patterns that were correlated with and interpreted through Anna Freud's psychodynamic theory of development (Freud, 1965; Kestenberg, 1975; Sossin, 2007). She was also influenced by the work of Austrian psychiatrist and phenomenologist Paul Schilder (Schilder, 1950), who hypothesized the important influence of an individual's self-perceptions, based on body image, on the person's relationship to themselves and the outside world.

Kestenberg's research group identified movement trends among the children's body contours and use of muscle tension. Two systems were identified as representations of an individual's ego functioning (Tension Flow) and his or her relationship to self and environment (Shape Flow). Kestenberg aggregated her observed data into proposed normative frequencies of each movement element in diagrams, or profiles, which can be

compared within an individual or between individuals (Kestenberg-Amighi et al., 1999; Loman & Foley, 1996; Sossin, 2007).

The KMP theorizes a phase-like nature of development that is contingent upon parent interaction style, infant temperament, and environmental factors, similar to dynamic systems theory (Thelen, 1995). KMP methodology includes manual transcription of observed movements, followed by frequency counts that are graphed and interpreted based on hypothesized expectancies of an individual's needs (TFRs), temperament (Tension Flow Attributes), learning style and defenses (Pre Efforts), coping skill and creative intelligence (Efforts), self feelings (Bipolar Shape Flow), feelings about others or objects (Unipolar Shape Flow), simple relationships (Shaping in Directions), and complex relationships or social intelligence (Shaping in Planes; Loman, 1994, 1998; Loman & Foley, 1996). Nine diagrams represent each aforementioned element's frequency counts. Despite its psychodynamic terminology, the KMP is not limited to stringent psychoanalytic interpretation and may be positioned among other theoretical frameworks, according to its descriptions (Kestenberg-Amighi et al., 1999; Lewis & Loman., 1990; Reale, 2011).

Studies on KMP theory and methodology exist but do not abound within the scholarly literature. Much of the research focuses on infant-parent dynamics and nonverbal markers of disturbances using KMP descriptions of movements (Romer & Sossin, 1990; Sossin, 2002, 2007; Sossin & Birklein, 2006). The following provides a descriptive overview of the broad domain in which the KMP has appeared in the research literature.

Lotan and Yirmiya (2002) studied the length of time children took to fall asleep while the toddler's parents were either present with them or not, and used KMP movement patterns to describe and interpret the children's movements. Thirty children, aged 24 to 36 months, and their parents participated in the study. The children were from upper-middle class families with little variation in ethnicity. Data were collected from the child's parents and pre-school teachers to measure the child's mental age. The children's mothers also completed a questionnaire to assess their toddler's temperament. Parents were instructed to start and stop a video recorder that was placed above the child's crib, to record the child as they fell asleep and for 20 min post-falling asleep. Footage was collected from three nights of videotaping.

The children's TFRs and tension flow attributes were coded and compared with computerized analyses of the children's joint movements. Twenty-three children took less than 30 min to fall asleep ($M = 12.57$ min, $SD = 7.8$) while seven children took longer than 30 min to fall asleep ($M = 44.5$ min, $SD = 13.47$). There was no significant difference between boys and girls in falling-asleep times. Parent presence was found to be a significant variable in toddlers' falling asleep times; children took longer to fall asleep when their parents were in the room with them. The authors found that children who exhibited more *kicking, tapping* movements took longer to fall asleep than the children who used *sucking, rocking* movements.

They also noted correspondence between wave-like movements and the child's mental age ($r = .69$, $p < .0001$), supporting KMP predictions that wave-like movements are common in four-year-olds and in children younger than four (as in this study) who exhibit advanced mental age. The authors concluded that temperament was not associated

with length of time a toddler took to fall asleep. They suggested that despite having objects (pacifier, bottle, music) present to assist the child, it is actually the type of movement the child exhibits that assists (or does not) in falling asleep.

This finding is relevant to the dance/movement therapist seeking preliminary evidence-based treatment options in infant-parent psychotherapy because understanding of movement patterns may provide a parent insight into potential difficulties encountered with their children, and can provide the therapist options for intervention. The reliability of the study's findings may be limited as the number of raters and their agreement was unclear and the sample size was modest ($N = 30$). This study demonstrated the utility of pairing KMP analysis with digital analysis tools.

In another study, Koch (2007a) incorporated a digital analysis tool along with KMP analysis to measure adult movement patterns. This researcher applied the KMP as a descriptive and interpretive tool when she investigated use of defensive behaviors (Pre Efforts) during business team meetings. According to KMP theory, Pre Efforts are a somatic representation of defenses against unwanted internal feelings (such as anxiety, anger, or fear), and are often observable when individuals are in a learning situation or when in social conflict (Kestenberg-Amighi et al., 1999). The author initially intended to investigate 20 teams comprised of same-sex or mixed-sex groups; however the groups studied were reduced to one based on the members' ($N = 4$) high level of movement expression and the author's conclusion that females tended to be more expressive than males after casual observation. The principle phenomena under investigation were individual use of Pre Efforts and whether these behaviors increased during times of inter-member conflict. The author predicted that heightened conflicts would be positively

correlated with heightened use of Pre Efforts and that individuals would use more mature nonverbal coping strategies (Efforts) when not engaging in inter-member conflict.

Using THEME, a video analysis tool, and the KMP rating system, the author compared the team members on frequency of Pre Effort behaviors and team member talking time, feedback/back-channel behaviors, and affect expressions. Seventeen minutes of footage were coded. Using Cohen's Kappa, inter-rater reliability was assessed for two raters on each of the measures of observation and was found to be adequate, except for measuring Pre Efforts and Efforts. When compared with the ratings of a novice rater, who had completed one 2-hr training, one of the two raters' (Rater 1) results was $Kappa > 0.70$. Based on these results, the researcher used ratings only from Rater 1 to analyze KMP data.

Findings indicated that Pre Efforts nearly doubled in frequency during times of conflict between group members. Other findings included the increased likelihood of Pre Efforts in one person to elicit Pre Efforts in the other during conflict. No relationship was found between Pre Efforts and gaze behavior, affect, or talking times. The study is limited in that the sample size was small ($N = 4$), inter-rater reliability was low as only one rater was used for KMP analysis, and the data analyzed were selected with bias. Though the study does not offer predictions for this non-clinical population, it was constructed in a way that could be replicated with a larger sample and multiple raters. The study does, however, illustrate a potential complementary use of the KMP with software designed to statistically measure visual data, thus addressing the problem of subjective data collection and analysis in KMP rating.

The previous study, along with others, addressed the essential need for reliability among raters for the KMP method to be considered valid. Koch, Cruz, and Goodill's (2001) study addressed reliability issues with the KMP by designing a pilot study of inter-rater agreement among newly-trained KMP raters ($N = 5$), who were also dance movement therapy graduate students. Each rater coded TFRs, Bipolar Shape Flow and Unipolar Shape Flow of adults ($N = 4$), each individually videotaped telling a personal story to or receiving discussion prompts from one of the researchers.

Twelve minutes of footage per participant were coded by each rater separately. Generalizability Theory was used to gain information about individual and cross-compared rater performance, including areas in which a rater may hold bias—halo effects, for example. Contrary to the researchers' expectation, TFRs were similarly rated across raters despite this element being more difficult to document than Shape Flow. Findings also indicated low reliability in applying the KMP to research or clinical practice based on these initial findings. Larger samples of raters would be required to corroborate such findings. Surprisingly, the researchers did not compare student raters from different KMP training programs; thus the results reflect the training quality of only one instructor, limiting generalizability to other KMP training programs or instructors.

This study is particularly relevant to dance/movement therapists, whose epistemology is grounded in nonverbal behavioral assessment and clinical intervention. Given that dance/movement therapists are instructed in movement assessment tools for clinical practice, it is imperative that the very systems they are incorporating in mental health practice be scrutinized for validity in order to appropriately guide treatment. The preliminary data of this study point to such needs and set a model for replication studies.

Sossin and Birklein (2006) assessed the Shape Flow of mothers and their children in order to determine the relationship between the two individuals and the effects of stress on the expression of feelings about self and other. Twenty-six parent-child dyads who identified as experiencing non-clinical stress were recruited to participate in the study. Children ranged in age from 11 months to four years. Parents completed three self-assessment standardized tests to measure various levels and types of life stressors. Each dyad was filmed for 15 min during structured play, unstructured play and feeding the child. Frequencies were calculated according to KMP procedures, and those scores were tested for correlation with mothers' life-stress test scores.

The authors expected that mothers who tested at higher levels of stress would demonstrate higher frequencies of shrinking body contours, abrupt movements, and constricted muscle tension with either extremely high or extremely low amplitude. Such movements reflect displeasure, negative self-feelings and disharmony as viewed within the KMP paradigm. Analyses of KMP frequencies showed that stressed mothers demonstrated more abrupt movements while in a state of constant muscle tension and being "zoned out" (KMP Attribute labeled as Neutral Flow). These high-stress parents exhibited restricted facial affect expression and animated movements. Children of these parents demonstrated low intensity movements as well as movements indicating internal maladjustment (Clashing). The authors attributed this clash to the child compensating for the disharmony the child perceived in the mother.

KMP theory posits that clashing movements in the vertical plane are associated with feelings of pride and shame, consistent with the findings of this study (Kestenberg-Amighi et al., 1999). Mothers' clashing movements occurred in the vertical plane and

corresponded with reported negative self-feelings. The results suggest that parental stress may be detected and reflected in the child via nonverbal expressions of Tension Flow and Shape Flow. The authors demonstrated correspondence between these KMP measures and a standardized assessment, providing preliminary support for the KMP's validity in measuring depressive symptoms, which also includes self-feelings. Because normative data have not been established for movement qualities between parents and children, findings from this study are not generalizable.

Another study and one case example illustrate how researchers have attempted to shed light on the KMP as a tool for nonverbal assessment of a child with Down syndrome. Gass, Kennedy, Hastie, and Wentworth (2013) used the KMP to assess the movements of two six-year-old fraternal twins, one with Down syndrome and the other who was typically developing. In this quasi-experimental design, KMP assessment, the Vineland Adaptive Behavior Scales (Vineland-II) and naturalistic observation were used for data collection. Video footage was taken of the children while they played in their backyard and while they played indoors, totaling 43 minutes of footage. Each child's complete KMP profiles were coded and interpreted by one rater, though it is unclear whether this rater was blind to the child's diagnosis. The researchers used data from the Vineland-II interviews with the children's mother to assess the children's motor, social, communication and daily living skills. Findings show the typically-developing child scored higher than her sister on all facets of the Vineland-II. Interpretations of the KMP profiles indicated the child with Down syndrome demonstrated more use of Neutral Flow, which corresponded with previous studies that indicated children with Down syndrome have marked slow and passive movements. Psychological interpretations of

each participant's KMP profile were given, as well as treatment recommendations for the child with DS in order to develop her social skills and increase her repertoire of developmentally appropriate behaviors. The small sample size and use of only one rater point to limits in reliability and internal validity. In addition, the design of the study is questionable given that there was no actual measure of KMP-informed treatment suggestions. Such a study demonstrates use of the KMP as a descriptive tool with evident need for follow up studies of its utility with children with Down syndrome and other developmentally atypical populations.

Loman (1994) described application of KMP theory and methodology to child populations including coding fetal movements *in utero*, under the assumption that children communicate affect through their motor behavior and so it is possible to communicate empathy toward the child by relating to the child somatically. The author proposed that development is stage-like and predictable, and that parents can be educated as to behavioral expectancies in the child and how to respond appropriately. By using dance/movement and other creative arts therapeutic modalities, it was presumed that aggressive behaviors can be assuaged, relational skills can be attained and dyadic stress can be avoided. Thus, the author described KMP-informed intervention strategies appropriate to each developmental phase up to age six.

Loman (1994) also detailed the TFRs and Tension Flow Attributes and their role in fostering empathy through attunement. In addition, expectant mothers were trained to feel their child's movements with their hands on their stomach and matching the quality and intensity of the child's movements in their own muscle tension. The mothers were instructed to draw the movements on paper as they felt them. The author theorized that

this process facilitates empathy and begins the process of building Winnicott's (1971) safe holding environment. She concluded that parents who understand development and phase expectancies are better able to meet the needs of their children at each age; and dance movement therapists are equipped to address therapeutic challenges by applying KMP theory to clinical practice. The paper does not, however, cite empirical support for the therapeutic recommendations; rather, it offered case illustrations.

The KMP has been further outlined as a tool for dance/movement therapists in clinical assessment, diagnosis and treatment (Kestenberg-Amighi et al., 1999; Loman, 1998; Loman & Foley, 1996). Loman and Foley (1996) wrote:

Movement patterns evolve as the individual matures. A predictable sequence of movement development that parallels psychological development can be observed. When traumatic events or obstacles impede the normal growth process, maladaptive experiences get stored in the body and are reflected in body movement. (p. 341)

The authors contended that this assumption is inherent to dance/movement therapy and is reflected in the KMP. They detailed a case study of application of KMP conceptualizations of nonverbal expressions of temperament and psychosocial needs of an adolescent girl diagnosed with cerebral palsy, who received weekly 30-minute dance movement therapy sessions over the course of nine months.

The investigators noted an increase in the girl's social functioning and decrease in inappropriate behavior patterns at the end of treatment. They also noted attunement (Stern, 1995; 1971) as a distinguishing factor in dance/movement therapy's effectiveness in building therapeutic alliances, and they described the TFRs and Tension Flow

Attributes as descriptors of the process of attunement—matching one’s muscle tension with another person’s levels of muscle tension. This article provides further clarification of KMP theoretical principles applied within the therapeutic context and preliminary data for describing facets of the successful therapeutic relationship, such as attunement.

In another study with children, Burrill (2011) aimed to assess the developmental appropriateness of various activities for children ($N = 14$) aged three and a half to five years, by using the KMP as the descriptive and assessment tool. The researcher used an ethnographic and emergent design to investigate “why creative, intelligent children sometimes fail in school” (p. 112) by assessing children’s levels of expressivity in each activity. A group of children were videotaped while engaging in four different activities—sitting in a circle, free play time, improvised dancing, and making art. Then, the researcher coded 20 min of footage from each activity. Rather than coding individuals, the author elected to code the most prominent movements exhibited by any child. The coding of each segment was repeated three times to recheck previous results.

The researcher indicated her reliability as sole rater for this study was based on her prior participation in a KMP inter-rater reliability test through a Pearson r comparison, which averaged to be .90, though detailed reference to this information was not provided. Since the KMP might be considered a type of performance assessment, it may have been more reliable to use Generalizability Theory in determining the author’s agreement with other raters to determine her competence as a rater. Analysis of the frequencies indicated increased use of Neutral Flow (de-animated movement) and decreased use of jumping and swaying rhythmic movement during the formal circle activity. It was concluded that the circle activity required children to engage in activity

inappropriate to their development, and that the less structured activities allowed for children to channel age-appropriate expectancies, such as jumping and swaying. The author attempted to employ the KMP in a novel approach by assessing group movement patterns; however, the study demonstrates flaws in design, implementation, and interpretation, limiting corollaries of the KMP as a reliable assessment tool for group behavior.

Reale's (2011) dissertation used frame-by-frame video analysis and aimed to investigate reliable use of the KMP in predicting movement qualities of depressed mothers during various types of interactions with their children. Mothers ($N = 87$) and their children, aged 12 months, were videotaped during unstructured and semi-structured activities. The mothers had previously completed the Depression Experiences Questionnaire before the videoed interactions. Mothers' facial movements were analyzed and coded via the KMP methodology. Inter-rater agreement was established for coding Shape Flow, and data were analyzed micro-analytically, at 30 frames per sec. This was the first study of its kind to use the KMP to analyze videos frame-by-frame and not in real time.

Results indicated that depressed mothers who scored high on dependency traits used Bipolar Widening followed by Unipolar Hollowing with high frequency. These data support KMP theory about Shape Flow movement patterns and their relationship to self-feelings. The findings also suggest movement sequences rather than movement frequency alone are an important factor in identifying intersubjective dynamics. The author claimed that:

Analyzing quantities or frequencies of behaviors has not proven sensitive enough for the dynamics inherent in mother-infant interaction. Investigating the sequence and timing of nonverbal actions yields a better understanding and more clearly defined concept of regulation and the significance it has on the future implications of infants, mothers and their relationship (Reale, 2011, p. 37).

KMP in Dance/Movement Therapy

The KMP appears in the dance/movement therapy literature as a theoretical perspective and movement intervention resource across a variety of clinical cases. Loman (1998) detailed the TFRs and the use of attunement and mirroring of those movement patterns to foster empathy between parent and child, as well as to offer creative channels for expression within the child's different developmental phases and related needs. A recent case study by Colace (2017) highlighted integration of KMP theory when approaching treatment of developmental trauma, with particular focus on the therapist's use of breathing and TFRs to create attunement with the client. The author emphasized the relational process within therapy, a significant aspect of the healing process, and the critical awareness of tension flow and shape flow by the therapist. Betty (2013) also incorporated the use of rhythms along with tension flow attributes, efforts, and shape flow as an intervention protocol to support regulation in maltreated children. The author wrote, "Caregivers may also assist children in externalizing [uncomfortable internal] sensations, developing them into rhythmic movements" (p. 49). The author corresponded these movement interventions with polyvagal theory, stating:

Movements such as rocking, swinging, nonnutritive sucking, and breathing with slow exhalations can help promote calm states by

enhancing the impact of the myelinated vagus on the heart (Porges, 2011; Stifter & Braungart, 1995). When helping children to de-escalate, a progressive transition towards these rhythms can be quite effective. Over time, children will internalize these rhythms and be able to use them for self-soothing. (p. 50)

A recent study by Koch et al. (2015) tested the effects of a movement- and drama-based creative arts intervention for violence prevention within a group of inmates in a German prison. Part of the data collected in the study was the observation of the KMP TFRs used by the inmates to determine rates of potential for aggression and needs expressed by the participants.

Neutral flow, a KMP conceptualization of movement that appears affectless or de-activated, was observed in pediatric patients on an onco-hematology unit (Plevin & Parteli, 2014). The clinicians in this study of dance/movement therapy as an intervention for children who were hospitalized stated treatment goals as to increase animated flow and to increase rhythmic variability in the children's movements—either spontaneous or improvised. Also integrated within the treatment framework were Laban and Bartenieff effort patterns. Neutral flow is another unique movement descriptor by the KMP that can reflect numbed feelings, severe depression or illness, and disconnection from thoughts and feelings (Kestenberg-Amighi et al., 1999). It marks an important clinical use as demonstrated by Plevin and Parteli, in that an appropriate clinical goal is to support reanimation or reconnection to one's internal sensations and sense of aliveness.

Dance/movement therapists have also incorporated the KMP perspective when treating clients with issues such as concealed stigmas (Roberts, 2016), incorporating pre

effort, effort, and shape flow movement patterns to address and improve intra- and interpersonal relationships for these clients. Pre effort and effort qualities of movement reflect defense mechanisms and coping skills, respectively (Kestenberg-Amighi et al., 1999) and shape flow reflects relational development. The author highlights use of these as movement interventions to address the relationship between an individual and his or her body as well as within the community while coping with conditions considered taboo by the surrounding culture.

The treatment of autism and spectrum disorders has also been approached through a KMP lens (Kestenberg, 1954). Loman (1995) described a case study in which the author worked as a dance/movement therapist with a four- year-old boy diagnosed with autism. The treatment approach consisted of attuning to the child's movements through matched muscle tension of the TFRs and facilitating rhythmic movement in the developmental sequence outlined by the KMP. Each developmental movement was introduced as the child was ready. The author reported how the child displayed more advanced movement/cognitive patterns of a three-year-old, evidence that after engaging in the DMT sessions of these developmental movement patterns the child was able to progress one year in development toward his actual chronological age. Given some of the inherent features in the diagnosis of autism include repetitive movement patterns, the KMP has also been a resource for clinicians in analyzing children's movements to assist with motor and verbal skill building in dance/movement therapy treatment (Parteli, 1995). One author used the perspectives of planal movement described by the KMP as a way to diagnose trauma in a young child who had been previously misdiagnosed and who displayed disruptions in developmental movement patterns (Baudino, 2010)

The KMP is not limited to use within an individual psychology framework, however. Recently, Koch and Rautner (2017) investigated relational implications of the TFRs in a study of social embodiment. The authors did a study of haptic feedback in which participants were embraced by a research assistant, who used different orders of smooth (sucking rhythm) and sharp (snapping/biting rhythm) quality pats on the back. It was hypothesized that the participant would perceive the smooth movements to feel connecting and the sharp movements to signal disconnecting or releasing from the embrace. Results showed that no matter which order the movement qualities were presented, participants rated the snapping/biting rhythm to signal the end of the embrace or separation from the other person. The study provides further support for the distinctness of dynamic body movement, and TFRs in particular as salient to not only individual experience but also interpersonal embodied communication.

Rhythmic Movement in Dance/Movement Therapy

Rhythmic movement is one of the hallmarks of dance/movement therapy treatment interventions, as it was a primary quality used by DMT pioneer Marian Chace in the 1940s to treat severely mentally ill psychiatric patients (Chace, 1945). Chace wrote, “Movement about the room, physical action in harmony with a group, and relaxation of tension are the aims of rhythm in movement as used at Saint Elizabeth’s Hospital” (p. 245). Chace used music, often waltzes, to create group synchrony improve interpersonal skills among the patients, however she did not identify specific rhythmic movement descriptions for quality or intensity. More recent case descriptions of touch in dance/movement therapy using rhythmic patting either for self-regulation (Seoane, 2016) or interpersonal connection (Sakiyama & Koch, 2003) have been identified, but have not

either referred to KMP rhythmic movement characterizations or identified theoretical frameworks for rhythmic movement incorporated in those sessions. Specific movements descriptions of each movement were also limited.

Malkina-Pykh (2015) formulated a treatment approach using rhythmic movement that is grounded in Lowen's Bioenergetics work, dance/movement therapy principles, Erikson's stages of development, and aerobics. The method is named Rhythmic Movement Therapy, and its primary function is to address central problems associated with specifically-defined character typologies and to use rhythmic movement as a means of treatment for those problems. Traditional folk dances are one example of a rhythmic choreographed movement used to evaluate a person's communication skills. The theory has yet to be tested for reliability, though this experimental study demonstrated pre- and post-test improvements in participant's overall subjective well-being after experiencing a Rhythmic Movement Therapy session. Rhythmic movements were not specified or classified according to quality or intensity.

Another model, The Dance of Awareness (Osbond & Brown, 2016) incorporated developmental theory, including the KMP, to create a therapeutic model for groups to integrate early developmental issues. The groups are called *Free/Form*, during which "experiences belonging to preverbal stages of development are re-enacted in the present" (p. 140). Similar to the KMP approach, this model guides groups through developmental rhythmic movement patterns to address phases of development where healing for the individual may be necessary. The authors describe implementing "DMP's [dance/movement psychotherapy's] approach to accessing and recovering non-integrated

or undeveloped aspects of the non-verbal self through an exploration of movement, rhythm and play” (pp. 140–141).

The importance of rhythmic movement as a source for inter- and intrapersonal change has also been acknowledged to be instrumental in creating therapeutic change when also coupled with verbal processing—citing a multi-layered therapeutic experience addressing conscious and unconscious needs (Vermes, 2011). Similar to some of the previously mentioned publications, this perspective of rhythmic movement used general descriptions rather than specific characterizations of movement quality. In this article, the word ‘rhythm’ also serves as a metaphor for the interaction between intrapsychic content interacting with external environmental factors, rather than identifying specific body movements. No theoretical orientation was mentioned to ground the perspective.

Rhythmic movement has also served as a primary movement intervention for some dance/movement therapists working with attachment issues (Bowlby, 1988). Shafir’s (2015) case study of working with an adult male identified as having attachment disturbance is an example. Changes in the client’s movement over time were observed using the LMA and KMP systems, and those movements were compared with the client’s attachment status based on the Adult Attachment Projective Picture System (George & West, 2012). The author concluded, “somatic-based training that emphasizes knowledge of developmental movement and its role in attaining secure adult attachment status, can be extremely effective” (p. 252). Further, the author promoted use of rhythmic attunement along with creating a safe containing environment as paramount for secure attachment.

Rhythm Across Disciplines

Rhythm appears across a plethora of disciplines and its meaning varies depending on the area of study. In neuro-rehabilitation, for example, rhythmic auditory stimulation and use of rhythmic music has been used to assess proprioception, diminish joint pain, and improve smoothness of gait movement in a music-based therapy called movement sonification therapy (Sihvonen, Soinila, Saerkaemoe, Tervaniemi, & Altenmueller, 2017). The authors of this recent study argued for the use of music-based interventions versus use of a rhythmic metronome for patients to synchronize their gait movement to because the familiarity of music may enhance participants' motivation and, thusly, the treatment effect.

Rhythm is also a measure of neurological activity as measured by EEG outputs of theta and alpha oscillations. Researchers have used EEGs to measure and demonstrate the significant relationship between the rhythmic activity of alpha and theta brain waves during memory performance tasks (Chen & Caplan, 2017). Another example of rhythm in neuroscience is the identification of neurochemical factors that control basic human rhythmic patterns: breathing, walking, and chewing (Jordan & Sławińska, 2011). The neuromodulator, 5-hydroxytryptamine was identified to play a significant role in each of the three rhythmic movements and their coordination.

Sleep science is another field that focuses heavily on rhythm, specifically in circadian rhythms. Melatonin, a neurochemical responsible for regulating sleep-wake cycles, and its production have been described as rhythmic in measured output when testing for conditions such as delirium (Angeles-Castellano, Ramirez-Gonzalez, Ubaldo-Reyes, Rodriguez-Mayoral, & Escobar, 2016). Rhythmic Movement Disorder, a

disturbance in sleep-wake transitions, is characterized by abnormal nocturnal movement patterns such as violent rocking, head banging, or leg banging; and has been diagnosed using video analysis and polysomnography (Dyken, Lin-Dyken, & Yamada, 1997; Kohyama, Matsukura, Kimura, & Tachibana, 2002).

Lourie (1949) considered as a founder of child psychiatry and infant mental health, identified rhythmic patterns observed in young children and emphasized the importance of the first three years of life as critical to the lifespan health of the individual. The primacy of nonverbal behavior, and descriptions of interactions as rhythmic in nature, in neonatal and infant-parent research has been emphasized by leading researchers in this specialty (Beebe, et al. 1982; Beebe & Lachmann, 2017; Condon, 1982, Condon & Ogston, 1971; Condon & Sander, 1974). Vocalizations measured in terms of rhythmic cycles have pointed toward attachment style outcomes, according to these researchers. Speech and language development has also been highlighted to be significantly influenced by the quality and duration of vocal and bodily exchanges between mothers and children in rhythmic synchrony or interactional attunement. Vocal rhythms and phrasing observed in the interactions between four-month old infants and their parents have been demonstrated to predict an infant's attachment style and cognition (Jaffe, Beebe, Feldstein, Crown, & Jasnow, 2001). Evolutionary research has recently sought to identify the mechanisms for isochrony, the rhythmic division of time into equal parts that is inherent in the autonomic nervous system and is the substrate for language and musical creation in humans (Ravignani & Madison, 2017). This research has shown that not only is humans' internal isochrony responsive to external sources of rhythm, such as dancing to rhythmic music, but also

internal isochrony naturally occurs internally to support functions such as respiration, heart rate, and locomotion. When there is a disturbance in isochrony, this can be observed in conditions such as Parkinson's Disease. Rhythms of respiration have also been measured as modulators of neural synchronization that influence cognitive functioning (Varga & Heck, 2017).

Rhythm in the form of synchronized and asynchronized movements has been shown to influence prosocial behavior outcomes in young children (Rabinowitz & Meltzoff, 2017). This finding was similar to another study in occupational therapy that promoted use of teaching cultural dances that are rhythmic and specified steps to integrate occupational well-being, used in clinical and community settings (da Costa, & Cox, 2017). Prosocial outcomes such as group cohesion have been demonstrated to increase after participants in a study imagined that they were walking in synchrony with others (Cross, Atherton, Wilson, & Golonka, 2017). This study demonstrated that imagined rhythmic synchrony can affect certain qualities of group dynamics and improve feelings of connectedness between members.

Music therapy, with its emphasis on the use of music as a clinical treatment intervention, is another discipline in which the concept of rhythm is evident. One of the pioneers in entrainment in music therapy, Thaut and colleagues developed original research in applying rhythmic auditory stimulation to motor control (Thaut, Kenyon, Schauer, & McIntosh, 1999) and have demonstrated the effectiveness of rhythmic entrainment for rehabilitation in cognitive, speech/language, and gait neurological faculties (Thaut, McIntosh, & Hoemberg, 2015). Entrainment, or internal synchronization to an external rhythmic beat, has also been a treatment modality for individuals with

sensorimotor disturbances such as people with autism (LaGrasse & Hardy, 2013). In this study, the authors cited evidence that supports the notion that, despite challenges with sensorimotor regulation, individuals with autism spectrum disorders can effectively demonstrate auditory-motor synchronization. The authors integrated previous findings that use of rhythmic stimulation supports proprioceptive control indicated the use of rhythm as a chief intervention strategy for movement regulation and creating new movement patterns. Ramachandran and Seckel (2011) made an argument for the use of rhythmic dance therapy in front of mirrors as a treatment for children with autism, citing the activation of mirror neurons toward improved social and regulatory skills according to their previous research into neurobiology of autism. No known follow up research by these authors has been identified, however.

Rhythm has appeared as a measure of the quality of interpersonal skills in groups of people diagnosed with borderline personality disorder and being treated with music therapy interventions (Foubert, De Backer, & Collins, 2017). In this study, an experimental design tested these participants against a control group to measure rhythmic patterns in piano music therapy sessions between the therapist and the client. Clients with borderline personality disorder showed higher inconsistencies in rhythmic timing and regularity as well as challenges with maintaining rhythmic synchrony with the therapist than did the controls. Clients with BPD also showed less control over their impulses than did the controls.

Group rhythmic drumming was investigated as a music therapy intervention for general stress and initial investigations into this modality demonstrate successful reduction in stress-producing hormones as well as increased individual sense of overall

well-being and connectedness when compared with a control group—both groups were nonclinical participants (Bittman et al., 2001).

General recommendations using expressive arts therapy practices such as “sound and rhythm improvisations, drumming, painting, dramatic reenactment, or movement can also alter personal, interpersonal, and/or intergenerational rhythmic patterns” (Kossak, 2015, p. 109) have been made thusly.

Each clinical situation is unique and brings with it a very individualistic rhythmic resonance. The therapist must tune in and understand what is needed in the moment in order to guide the client in a way that is useful and in rhythm with the sympathetic resonance being presented. (Kossak, 2015, p. 102)

Another key figure in the study of rhythm is Colwyn Trevarthen, who has documented numerous studies in support of not only the role of sound but also the role of the body in the natural rhythmic tendencies humans have that serve as modes of self-expressions and as foundations for innate drives to communicate (Trevarthen, 2005, 2001). He, like many of the aforementioned researchers in music therapy, has underscored the important role that biological rhythmic processes play in creating a foundation for conscious movement activity and attuned communication between individuals (Trevarthen & Fresquez, 2015). The role of the body and voluntary movement has been acknowledged by these researchers, however rhythmic body movement has been described using descriptive language rather than connecting to theoretical descriptions or classifications of movement. For example, infant movement

has been described as having musicality and variation in gesture (Delafield-Butt & Trevarthen, 2015):

Infants, we have noted, make gestures from birth. These movements are expressions of self-regulation, but they are felt immediately to be communicative by a sympathetic partner, and they are ready from the start to learn new forms by imitation... Observations of interactions with infants in the first days prove that movements of head, eyes, face and hands, as well as simple vocalizations, may be negotiated with a partner and new forms acquired. . . . The arms and legs of a baby move spontaneously in regular extensions and retractions . . . kicks and arm punches, or more graceful waves and pointing movements, occur in rhythmic sequences with rise and falls in intensity . . . [fidgets] are oscillations of the wrists and small rotations of the arms, usually occurring in rhythmic left/right asymmetry. (p.17)

Given that rhythm plays such a vital role in micro and macro processes of the human experiences, there still remains a lacuna in the way that rhythmic body movements are identified and described. Some of the language used in the previous study could be conceived as evaluate or problematic to interpret, especially cross-culturally. With increasing importance embodiment is being placed within the conversation of rhythm, it is noteworthy to acknowledge an extant theoretical classification system for rhythmic movement and its potential utility as both a descriptive and evaluative format for rhythmic body movement.

Making a Case for Characterizing Rhythmic Body Movement

From Darwin's (1872) early documentation of nonverbal behavior and emotion expression across species in animals and humans, researchers over the subsequent century and a half have expanded this primacy of movement in animal communication to its centrality in human psychology across cultures. It has been argued that it is necessary to identify a language to describe the gross and subtle nuances of human movement, and to do so from a perspective of what Sheets-Johnstone (2009) described as "our common evolutionary heritage. Recognition of the ties that bind us in a common creaturehood and a common humanity is indeed essential to our own well-being" (p. 13).

The TFRs of the KMP originate from biological contingencies and, therefore, appear in infant movements across different cultures and ethnicities (Kestenberg Amighi et al., 1999). Interpreted within a psychological framework, they are posited to be associated with needs and drives and the substrate of affective expression (Kestenberg, 1975). On a descriptive level, the ten TFRs are classified by the quality and amplitude of their alternations between constricted and released muscle tension, also called free flow and bound flow. Testing the classification of smooth- and sharp-quality movements identified by the KMP has shown findings concordant to the theoretical interpretation of these movements to be associated with indulgent or pleasant, and assertive or unpleasant feelings, respectively (Koch, 2014). Validation of the KMP and KMP theory called for by past studies (Koch & Muller, 2007; Koch, 2007b) can be further elaborated by replicating Koch's (2014) recent findings and also by expanding them by testing each of the TFRs for its interpretive accuracy according to KMP theory. Given that the TFRs are assumed to reflect needs and drives in early development and continue throughout the lifespan

(Loman, 2007, 2017) testing adult groups of participants would provide initial insight into this presumption. Understanding if adults can experience different internal sensations and feeling states when embodying the specific rhythms described in quality by the KMP theory would help to shed light on the theoretical accuracy for the meaning of rhythmic movement.

Challenges and Considerations

Despite its comprehensive and systems-like approach to psychological interpretation of motor development, the KMP is theoretically complex, requires extensive training, and has yet to be confirmed as a reliable and valid instrument to assess and treat various psychological states. It requires subjective appraisal and its theories about developmental psychomotor norms have yet to be evaluated. It is, however, incorporated as an assessment tool by dance therapists within the United States and internationally such as in Germany (Capello, 2008; Koch, 2007) and Israel (Lotan & Tziperman, 1995). Janet Kestenberg's research investigated the KMP's multi-cultural applicability in Bali and Iran, using the KMP as a descriptive tool for observed cultural movement norms similar to and different from those in Western cultures (Kestenberg-Amighi et al., 1999).

Caldwell (2013) argued that assessment in dance/movement therapy may not effectively take into consideration cultural differences and culture of the rater, both impacting rating objectivity. She further contended that research methods must be grounded in feminist and constructivist theories, thus incorporating more phenomenological, qualitative studies of people's lived experiences. She rejected the notion of universal movement qualities and positivist ontology toward understanding

human body movement. In fact, the author characterized formal assessment of movement within clinical dance movement therapy as unnecessary to understanding an individual's reality or guiding effective treatment. Instead, she placed precedence on one's awareness of internal sensation and individual meaning making. This perspective, however, does not fully address appropriate treatment for individuals who are limited in verbal or cognitive capacities, such as pre-verbal children and individuals with autism and/or severe mental illness.

The KMP is one of many Laban-derived assessment tools used for the purpose of evaluating and interpreting an individual's psychology through his or her body movement. Cruz and Feder (2013) indicated that establishing test-retest reliability of the KMP as a reliable measure for various psychological processes still remains an area in which more research is needed. However, none of the aforementioned studies addressed employing the KMP as a descriptive or evaluative tool for such pervasive clinical issues as autism, schizophrenia and post-traumatic stress disorder. There is also no current research indicating whether KMP-based psychotherapeutic interventions (e.g., Romer & Sossin, 1990) are any more or less effective than other kinds of movement interventions such as dance classes, play therapy or other expressive therapies.

Conclusion

As this review of literature has described, rhythm has been demonstrated as a powerful concept across wide ranging disciplines and within the creative arts therapies, however few authors in these fields have acknowledged or investigated rhythmic body movements when considering affect. Moreover, KMP theory of the TFRs has rarely been acknowledged across rhythms research in the creative arts therapies as a movement classification system for conceptualizing repeated motor patterns (Davieson & Skewes, 2002; Fuchs & Koch, 2014; La Barre, 2011; Lusebrink, 2010). Therapists and researchers in the field of embodiment, however, need ways to describe the nuances in dynamic movements they witness in clients, and to be grounded in theoretical frameworks that have been empirically investigated (Carroll, 2011; Koch, Caldwell, & Fuchs, 2013). Testing the validity of the KMP and its theoretical interpretations of rhythmic movement is a logical next step in advancing knowledge about this theory's validity for interpreting meanings of early developmental movement patterns. Investigating these patterns in a group of self-reporting adult participants will contribute to understanding of how KMP rhythmic movements are experienced and interpreted across the lifespan to test the theory that specific affective responses to each of the TFRs holds longevity into adulthood.

CHAPTER 3

Methods

The intent of this study was to examine the validity of the TFRs within the KMP theory of body movement description and assessment. The KMP identifies 10 rhythmic body movement patterns that are prevalent during the first five years of life and visible throughout the lifespan. Within each of the first five years, two TFRs are most predominant and each pair contains an indulgent, or smooth, quality; and a fighting, or sharp, quality. These rhythms are biological in origin and contribute to the foundation of phenomena such as needs, drives, and affect expression. The theory holds that each of these rhythms has a unique presentation in body movement as well as a specific psychological correlate associated with needs and drives.

This study aimed to test the psychological correlates of the TFRs associated with the first two years of life, as experienced by non-clinical adults assumed to be typically developing. The TFRs from the first two years of life were selected because they are the earliest movement patterns identified by the KMP, including preverbal phases of development, and they served as an initial selection of the 10 TFRs to test feasibly. The researcher tested the hypotheses that adults would experience different affective responses for each of the four TFRs (H1); and that these adults would report the smooth-quality rhythms as associated with indulgent affects and the sharp-quality movements as associated with fighting affects (H2).

Design

To examine these hypotheses addressing participants' experiences of the rhythms, a mixed methods design was selected. Quantitative data consisted of survey questions on

a Likert-type scale, and qualitative data consisted of post-task interviews (Creswell & Creswell, 2018). Johnson and Onwuegbuzie (2004) asserted the superiority of a mixed methods methodology to draw upon the strengths of both quantitative and qualitative approaches in addressing a research question. In this study, both statistical and narrative data were acquired to strengthen the understanding of the KMP theory of TFRs, whereas one singular methodology would have limited the scope of results and conclusions that could be drawn, as assumed by the researcher.

The study focused on the first four developmental TFRs, two smooth (sucking and twisting) and two sharp (snapping/biting and strain/release), presented via video and enacted by participants. The repeated measures design used one baseline measurement and four repeated measurements after each of the four movement “tasks” participants were requested to perform. Thus, the independent variable (IV) was a repeated factor with two levels that could also be investigated as four levels, and the baseline was available to be used as a covariate to control for initial affect. More details of the quantitative design are detailed below.

Adult participants over the age of 18 were recruited from a college campus, as well as the surrounding community. Individually, participants completed a self-awareness scale and a survey measure of affect and then viewed video examples of each specific TFR. After viewing each rhythm, they reproduced the movements they saw, identified one word elicited by the movement, and then completed the survey of affect. Between each viewing, they participated in a brief movement distraction task to address carry-over effects, and each of the four TFRs were presented in a unique counterbalanced order for each participant to address order effects. In addition, a subsample of participants

completed an interview about their subjective experience of embodying each movement (see Figure 2).

Sampling and Recruitment

This study was approved by the Institutional Review Board of Lesley University. Participants in this study were selected by various methods of advertisement including: flyers posted on the Lesley University campus, recruiting in university classrooms, posting electronic flyers to universities within the metropolitan area, posting flyers on social media sites, and posting on internet discussion boards (see Appendix A for an example of recruitment flyer). Respondents contacted the researcher via her email address posted on the flyer. The researcher was able to travel to the Midwestern United States, where several respondents indicated interest, thus the demographics represent two different geographical regions of the US—the Eastern and Midwest regions. Requirements for participation included: a minimum age of 18 years old, willingness to do low-impact movement tasks, fluency in the English language (written and spoken), willingness and ability to volunteer for a 45 min (maximum) one-time experience, willingness and ability to travel to the testing location at mutually-compatible time, and agreement to informed consent form.

Prior to the start of recruitment, a power analysis was conducted to determine the appropriate sample size for this study. Based on the effect size of $\eta^2 = .07$ from Koch's (2014) study one data, a repeated measures ANOVA with an IV with two levels was chosen because it produces the more conservative estimate than an IV with four levels. For this design a power of .80 can be achieved at the alpha level of $p < .05$, with $N = 53$ participants (Jaccard & Becker, 2002); and 53 individuals participated in this study.

Ethical Considerations and Confidentiality

Upon agreement to participate in the study, each participant received an electronic copy of the Informed Consent Form (see Appendix B), which was also provided in hard copy format upon the participant's arrival at the study. During the study session, this researcher reviewed the contents of the informed consent form with the participant including assurance that the participant could elect to terminate their participation at any time in the study without penalty. Participants were informed of the purpose of this study and the procedures that would take place during their one-time session. The researcher assured participants of full confidentiality, their anonymity and, for participants who were interviewed, the use of pseudonyms in the data reporting. Participants were informed of the researcher's intended role, which was to be present in the testing room but to be as unobtrusive to the process as possible. This was demonstrated by the researcher sitting in a corner of the room and in a body position slightly averted away from the participant.

Participants were not informed that they would be evaluated by the researcher on their degree of accuracy in reproducing each of the four movement patterns. The researcher elected to refrain from informing the participants of this so as not to create individual effects that could have ensued if participants felt pressure to perform the task with a standard of perfection, resulting in possibly losing an authentic and direct response to each movement pattern.

Data Collection

A concurrent embedded strategy (Creswell & Creswell, 2018) was used to collect the data, wherein the quantitative component results served as a primary focus and the

qualitative component results served to broaden understanding of the statistical results (see Figure 1). Participants were tested on the following TFR movements: sucking (indulging), snapping/biting (fighting), twisting (indulging), and strain/release (fighting)—TFRs associated with the first two years of life. The intention was to collect preliminary data on four differentiated rhythmic movements. The aim was to learn whether participants experience different affective qualities when embodying differentiated indulging and fighting movements. Comparisons of participants' level of self-awareness and results from the movement tasks were collected.

In the qualitative component, data were collected to discern potential nuances and additional psychological material that might not have been captured in the quantitative data. Six participants agreed to participate in a brief follow-up interview about their subjective experience of each of the four rhythms in the experimental task. Potential participants for the interview were randomly identified from a pre-determined list of participant numbers (i.e., participant number 10, 16, 24, 28, etc.) and asked whether they wish to participate in the interview. Participants were recruited until six were identified. In the interview, verbal and visual prompts were used, and participants were asked to describe in as much detail as possible their sensory, cognitive, affective, and overall experience when embodying the different rhythmic movements. Interviews were audio-recorded and lasted no longer than 20 min. An interview guide based on the following questions was created to ensure that each participant was asked the same initial standard questions: Would you please describe what your experience was like when you were doing the (first, second, third, fourth) rhythmic movement(s)? What, if any, thoughts,

feelings, sensations, and/or qualities did those movements elicit for you? Please describe any additional responses you may have had when you were doing each of these rhythms.

The researcher posed follow up questions during the interviews to ensure a clear understanding of the participants' experience.

Measurement

Each participant was rated by the researcher, a certified KMP analyst and trainer, on their accuracy in replicating the movements observed on the video. Measurement of participants' post-movement affect was based on the movement-based affect scale (MBAS; Koch & Müller, 2007), a self-evaluative Likert-type scale. Koch developed the MBAS by initially identifying descriptive adjectives for KMP movement qualities from Kestenberg Amighi et al. (1999) to create the KMP Questionnaire (MBAS; Koch & Müller, 2007). The German version of this scale with 65 items was examined psychometrically and then a modified, brief version with 13 items was also created to produce what is now the MBAS. The 13 items rated on a 7-point scale require choosing between pairs of adjectives that reflect both indulging and fighting rhythms and shape flow qualities. Lower values correspond to affective words associated with indulging. The MBAS was modified for this study to include only the eight word pairs that relate to TFRs and exclude the five items related to shape flow movement qualities. While the German versions of both the longer and brief scales were translated to English, the English versions were not previously psychometrically examined.

Review of the English version of the eight MBAS word pairs for TFRs for the present study revealed some words that are not commonly used in American English (e.g., loaden). Because MBAS had been carefully constructed previously, to enhance it

for this study to best suit English speaking participants, the original German terms in Koch and Müller (2007) were translated again using Google Translate. Then those translations were further explored with *Roget's Thesaurus* (1980) to generate comparable English word pairs. Those considered closest to KMP theory were chosen. The revised word pairs were then submitted to an American expert in the KMP for consultation to confirm that the modified words adhere to the theory (S. Hastie, personal communication, February 24, 2017), and one change was recommended and made. This approach was used to build on the intensive work of Koch and Müller rather than to create a new instrument. The modified items are presented in Table 1 and the original items are in Table 2.

Lane's (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990) levels of ESA (LEAS) scale was used as a measure of self-awareness for each participant as well as a possible covariate in the data analysis. This scale is a 20-item electronic test in which participants respond to questions in narrative response format. The test developers perform the grading and provide a report to the researcher.

Table 1. *Modified English-Language Version of the Movement-Based Affect Scale (MEMBAS)*

How do you feel right now?								
relaxed	1	2	3	4	5	6	7	tense
happily excited	1	2	3	4	5	6	7	aggressive, intrusive
aimless, drifting	1	2	3	4	5	6	7	impatient, driven
indulgent, self-soothing	1	2	3	4	5	6	7	critical, distancing oneself
playful, flirtatious	1	2	3	4	5	6	7	stable, in control
compliant, yielding	1	2	3	4	5	6	7	rebellious
laid back	1	2	3	4	5	6	7	edgy, anxious, jumpy
peaceful	1	2	3	4	5	6	7	hostile

Table 2. *Original English-Language Version of the Movement-Based Affect Scale (MBAS, Koch & Müller, 2007) TFR Word Pairs Only*

How do you feel at present?								
Relaxed	1	2	3	4	5	6	7	tense
loaden/fighting	1	2	3	4	5	6	7	joyful, excited
drifting, layed back	1	2	3	4	5	6	7	impatient, driven
Indulgent	1	2	3	4	5	6	7	distancing oneself
holding back, retentive	1	2	3	4	5	6	7	playful, coy
Yielding	1	2	3	4	5	6	7	fighting
letting go	1	2	3	4	5	6	7	nervous
Peaceful	1	2	3	4	5	6	7	aggressive

Setting and Procedure

Each participant received an emailed link with a unique and anonymous code to complete the Levels of Emotional Awareness Scale (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990), an electronic self-assessment of one's degree of self-awareness.

Participants completed this on their own electronic device before arriving for the movement study. The testing instructions indicated that participants must complete the self-assessment without assistance from others; and it recommended participants select a quiet location in which to complete it.

A pre-arranged designated private room or classroom was created as the testing location, and the study was conducted one-on-one, with the researcher/proctor and participant. The following procedures were used: Upon entering the research lab and agreeing to informed consent, each participant was given a general description of the research task—that they would be asked to mimic different movements while viewing those movements on a video screen; and then complete a survey of how they felt in between each movement. Then, each participant completed the modified English language version of the MBAS (MEMBAS) self-assessment items to record how they were feeling prior to engaging in the movement task. Next, the participant engaged in the movement task, in which the participant stood facing a large screen and watched the person in the video projected onto this screen. Simultaneously, the participant mimicked to the best of their ability the movements they saw the person in the video doing for two minutes, the length of time used in Koch (2014). The video content consisted of this researcher, a KMP expert, embodying each TFR while standing in place; her whole body visible in the video frame. Rhythmic movements occurred in the whole body versus

localized to one body part. The expert maintained a neutral facial expression to control for influences of emotional tone possibly expressed through the face and affecting participant perceptions of each movement. The expert performed each rhythmic movement while facing the camera. After two minutes, the video stopped and each participant was asked to state one free word elicited by that movement. These free words were logged by the researcher. Then the participant completed the MEMBAS scale. Prior to the introduction of the next movement task, a brief movement exercise to relax and center the participant (stretching, “shaking off” the previous movement and feeling state, taking a breath) was introduced by the researcher to address carry-over effects. Twenty-four unique orders of presentation of the four TFRs (four factorial) were created for counterbalancing. These were generated through a random number generator computer application and assigned to each participant in the order that the next order was generated. Time allotted per individual session with the researcher was 45 min.

Data Analysis

Descriptive and inferential statistics were generated, and quantitative analysis of the data was completed using the SPSS. A theoretical (versus inductive) thematic analysis approach was used to analyze explicit semantic themes or patterns in the interview data (Braun & Clarke, 2006). Interviews were transcribed and coded using a theory-driven approach to identify patterns within responses to each TFR. Codes were analyzed to determine thematic material identified within each TFR movement experience, its relationship to the quantitative results, and to the KMP theory.

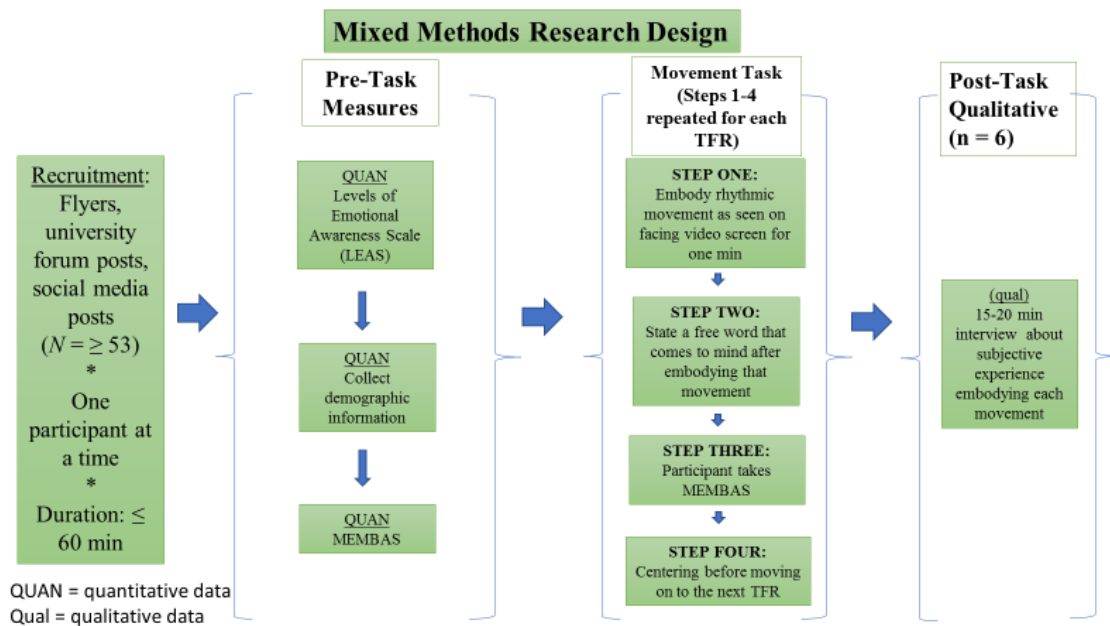


Figure 1. Mixed Methods Research Design Plan

Quantitative Data Analysis

In this study, the TFRs served as the IV with two levels (indulging and fighting) and were also conceptualized as four levels for analysis. The MEMBAS scores of affect served as the dependent variables (DV). After the data were collected, lines two and five of the MEMBAS were re-coded by placing indulgent words in the left column and fighting words in the right column so that the numeric codes reflect lower numbers (1–3) on the indulgent section and higher numbers (5–7) on the fighting section of the word-pair scale. For example, a rating of “1” for *aggressive/intrusive* was re-coded as a “7.” Repeated measures analysis of variance (ANOVA) was used to test the hypothesis that there would be statistically significant differences between participants’ affective experience (DV) of each of the TFRs (IV, two levels; and IV four levels). Repeated

measures designs have an advantage of power over between groups designs, which serves this study well. Emotional self-awareness (ESA) score, MEMBAS pre-test scores, and gender were tested as covariates by calculating their correlations with the DVs.

Qualitative Data Analysis

Six of the 53 participants were randomly selected by a random number generator and asked if they would be willing to participate in an interview about their experience of each of the four movements. Interviews were no more than 20 min in duration. Each brief interview was conducted, audio recorded, and transcribed by the researcher. A coding sheet in a Microsoft Excel file was created consisting of four categories representing each of the TFRs. Interviewee responses were listed under each TFR category. Responses were analyzed within each interview and across interviews (Ayres, Kavanaugh, & Knafel, 2003) to identify in-depth subjective experiences as well as thematic material between the interviewees. Guidelines for thematic analysis (Braun & Clarke, 2006) were also consulted when analyzing for thematic patterns within each rhythm and across the four rhythms. Member checking was used to confirm participant responses when needed, to ensure accuracy.

Integration of Quantitative and Qualitative Data

This study used a *concurrent embedded strategy* (Creswell & Creswell, 2018) in which emphasis was placed on the quantitative analysis and qualitative data would enhance understanding of the quantitative findings. First, quantitative analyses were conducted and then analysis of the qualitative interview data was conducted. Integration of these data was completed after each data set was analyzed. Details of the integration of both sets of data will be presented in the Results chapter.

CHAPTER 4

Results

Quantitative Results

The participants' ages ranged from 19 to 80 years with an average of about 43 years ($SD = 14.55$). Among the 53 participants, 13 or 24.5% were males and the majority were females representing 40 or 75.5% of the subjects. Nineteen participants or 36% were tested in the Midwest. Ratings of how accurately the participants replicated the movements varied from 2 to 4 with a mean of 3.72 ($SD = 0.5$). Four participants produced incomplete ESAs rendering their ESA score discounted from the analyses. ESA scores ranged from 33 to 97 with a mean of 69 ($SD = 22.8$). Lane's (Lane, Quinlan, Schwartz, Walker, & Zeitlin 1990) LEAS normative data were based on a sample of 387 adults aged 18-80 for males ($N = 190$, $M = 58.5$, $SD = 11.0$) with scores ranging from 30-86; and for females ($N = 197$, $M = 64.3$, $SD = 10.2$) with scores ranging from 40-90. In this study, the LEAS scores for males ($N = 13$, $M = 55.2$, $SD = 27$) did not significantly differ from scores of female participants ($N = 40$, $M = 66.7$, $SD = 21$, $t(51) = -1.61$, $p = .114$).

Descriptive statistics (Table 3) for MEMBAS ratings of each TFR are as follows. Among the four movements, strain-release had the highest mean score (4.55) with a difference of 1.61 points from the lowest mean which was twisting (2.94). Biting mean scores (3.75) and sucking mean scores (3.6) placed second and third with a difference of only 0.15 points. The scores of four TFRs have similar variations as their standard deviations are close with one another. The possible scores for each movement ranged

from one to seven. Figure 2 displays means and standard error bars for these data, as well.

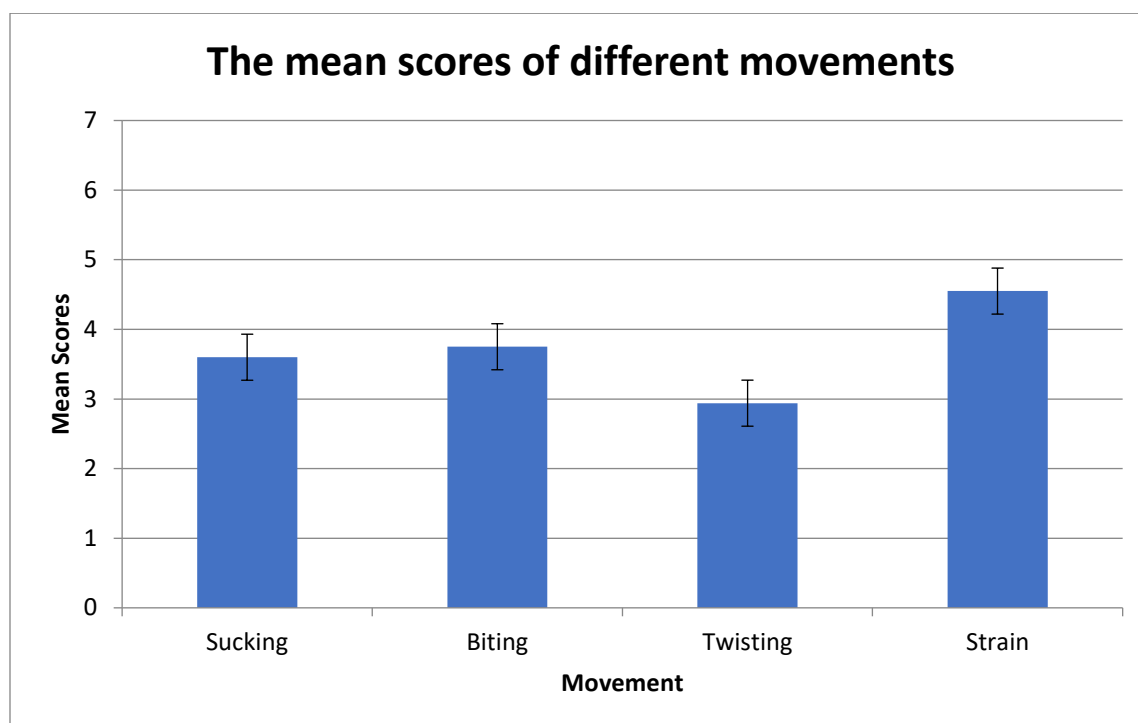


Figure 2. Mean Scores of Movements

Table 3. Descriptive Statistics of the Four TFR Scores

TFR score	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Sucking	53	3.60	1.790	1	7
Biting	53	3.75	1.616	1	7
Twisting	53	2.94	1.460	1	7
Strain	53	4.55	1.738	1	7

Spearman's rho correlations were used to test for correlations between ESA score, pre-MEMBAS score, and MEMBAS score for each movement. The correlations were

quite small ($< .19$) indicating that neither pre-MEMBAS scores nor ESA scores were effective covariates.

To test the first hypothesis, the assumption of sphericity was satisfied as the p -value for Mauchy's test of Sphericity was greater than $.05$. A one-way repeated measures ANOVA was conducted in a within-subjects design to compare the effect of four different rhythmic movements (IV) on MEMBAS scores (DV). Results showed statistically significant differences among the ratings of the movements, $F(3, 156) = 8.986, p < .001$.

A post hoc test of pairwise comparisons was conducted to which TFRs were statistically different from one another. Results showed statistical significance between the sucking versus twisting ($p = .03$), sucking versus strain/release ($p = 0.01$), twisting versus biting ($p = 0.01$), twisting versus strain/release ($p = 0.00$), and biting versus strain/release (0.01). Interestingly, there was no statistical significant between the sucking versus biting ($p = 0.59$) rhythms—the indulging and fighting pair of TFRs associated with the first year of life. These findings provide support for the hypothesis that adults experienced different affective responses for each of the four TFRs, except for the sucking and biting rhythms.

Next, a paired samples t -test within-subjects test was conducted to compare the movement quality categories (indulging and fighting) to test the second hypothesis. The sucking and twisting (indulging) rhythms scores and the biting and strain/release (fighting) rhythms scores were combined and tested as two factors. There was a significant difference in the scores for indulging ($M = 3.27, SD = 1.25$) and fighting ($M = 4.15, SD = 1.30$) rhythms; $t(52) = -3.59, p = .001$. Based on these findings, the

hypothesis that these adults would report the smooth-quality rhythms as associated with indulgent affects and the sharp-quality movements as associated with fighting affects was supported.

Testing for the effect of gender on the four MEMBAS movement scores, a mixed ANOVA with one repeated factor (movement) and one between groups factor (gender) showed a significant effect for the movements ($F(3, 153) = 5.4, p < .001$), but no interaction of movement with gender ($F(3, 153) = .68, p = .563$) and no significant main effect of gender ($F(1, 51) = .93, p = .340$).

Qualitative Results: Rhythmic Movement Elicited Complex Responses

One major theme and two subthemes emerged from the interview data. The major theme was that these rhythmic movements stimulated complex intrapersonal responses in these participants. The two subthemes were: memories elicited by movements, and the intensity and contrast of participants' reactions elicited by the sucking rhythm. Examples of interview data to demonstrate these phenomena will be provided using pseudonyms to protect interviewee anonymity.

The interview data revealed a host of cognitive and affective responses from each participant. Demarcus noted, "It was interesting to feel the emotional shifts throughout the experience. It was interesting to see that these [movements] could elicit an emotional response and it was a pleasant surprise. I wasn't expecting that." Lynn's experience reflected how she would identify a movement's psychological qualities as well as how she felt about those specific qualities—and how they potentially conflicted with one another. She said, "Like [the sucking rhythm] reminds me of nurturing, motherly love,

self-care, being relaxed, but that's not where I was at the moment...therefore, I rated that movement as irritating." Donna and Rena experienced wide ranging responses within one tension flow rhythmic movement, as well. When embodying the biting rhythm, for example, Donna noted that at one point it felt "harsh" and Rena used the word "biting" to describe the movement at one point in her embodiment of it. Donna, however, further described a pleasant and even soothing experience of the biting rhythm when she elected to modulate how intensely she tapped her body. Rena also described a pleasurable experience of this rhythm when its location shifted from self-tapping on the arms and hands to self-tapping on the head. David reported that he "liked all of the movements" and noticed that there were ones, in particular, that he had specific or stronger responses to than others. Katie remarked about her background in musical theater and, now living with a disability, that she appreciated that she could comfortably participate in this study and have varied experiences and responses to each movement when she embodied them.

Subtheme 1: Memories Elicited

The first subtheme noted was that engaging in movements elicited memories within the participants. When asked if she experienced any surprises throughout the embodying of the movements, Katie said that the twisting rhythm reminded me of her of "younger days where I did a lot of dancing and more flirting and kind of brought up some memories of that where I was more flirtatious; but in a fun way. And I was not expecting that. So it kind of brought up memories of that, so, and you never know what movements will bring memories back or what emotions it will elicit." David expressed experiencing a moment of self-consciousness when performing the biting rhythm when he reported, "it

reminded me of how fat I am and how much I need to lose weight.” Demarcus reflected on his overall experience sharing that he has background experience in dance and stated:

I guess the fluid type movements, you know, I’ve dabbled in other forms of free form dance type stuff, and back in my more limber days I used to be a liquid popper [a form of break dancing], so it involves some fluid movements and rhythmic elements, something that came out of the older rave community, so that kind of fluid type movement. So that movement reminded me quite a bit of that [time]. I would say they’re happy memories and times when I felt free and expressive and I was able to let go and live in the moment.

Lynn and Rena experienced more intense feelings associated with difficult past experiences. Lynn experienced a memory during one rhythm, in particular, the strain/release, where she recalled being a graduate student and attending a class that she hated so much she was often angry during and after attending this class. She said, “I would go into the bathroom and do movements like the Maori Haka, and that’s how I got through the class because I hated it so much.” When embodying the biting rhythm, Rena recalled, “Because I was physically abused as a child, my father was very violent, so as soon as [I] moved into hitting [my] hands I became upset and my body was becoming tense.” Rena recalled another memory elicited by the biting rhythm. She was in training to be a teacher and remembered that her instructor noted that “when I was teaching I would hit myself on my hips. And she said do you realize how much you hit yourself; that’s a sign of person who’s been abused and who continues to abuse their body.” Not only were memories elicited by some of the movements but also of note in Rena’s case

was that memories from early in development could be recalled through embodying specific movements. Of the sucking rhythm, Rena recalled, “it made me realize that I have this physical pattern around food from childhood.” This is an interesting individual finding given that the TFRs examined in this study are theoretically associated with the earliest years of development.

Subtheme 2: Intensity and contrast of responses to the sucking rhythm

The second subtheme noted across the participants’ responses was the strength or intensity that was reflected by the interviewees’ embodied experience of the sucking rhythm—the TFR associated with the first year of life. The most notable example is the participants’ responses to the sucking rhythm, in particular. This rhythm generated either very pleasing or very displeasing experiences in some of the interviewees. Katie said this rhythm felt “weird and kind of uncomfortable. I felt impatient, bothered; and it was just a weird and uncomfortable [movement].” Lynn also felt irritated. She said, “I didn’t like [the sucking rhythm] at all. It felt irritating. I wanted to do bigger, jagged movements and [this movement] wasn’t satisfying to get my [stress] out.” In a similar experience to Lynn, Rena expressed, “I don’t like this [movement].” Rena described hating the feeling of her fingers and hands coming into contact with food, and the sucking rhythm is a movement that she indicated doing whenever her fingers felt soiled. She said, “The whole eating thing I struggled a long time with, but the memory that came back and is still true today is that I do not like finger food; and [doing that rhythmic movement] gives me a sensation that I need to clean myself because when I normally do it, I’m irritated. I do it subconsciously.”

David, Demarcus, and Donna, on the other hand, had contrasting experiences with the sucking rhythm, primarily in the form of a pleasant experience. David said that the movement could have practical applications when he mentioned, “I could see myself doing that movement to calm myself down to not necessarily a flat line state but more of like a meditation [state]. It felt reassuring in a way. It was kind of relaxing. It felt good.” Demarcus said he experienced feeling “grounding and comforting . . . like giving yourself a hug” when embodying the sucking rhythm. Donna described this movement as “the happy dance” and a movement that serves as “smoothing the rough stuff out.” The sucking rhythm was the last in the order of rhythms that Donna embodied, and she noted, “I would’ve felt unsettled if I hadn’t done the smooth one after the rough one [the biting rhythm].”

Integration of Quantitative and Qualitative Results

Results from the quantitative output and the qualitative interviews were integrated first by examining each TFR’s average MEMBAS rating and comparing that to the narrative qualitative data.

Sucking Rhythm

The sucking rhythm’s average rating ($M = 3.6$, $SD = 1.8$) reflected more indulgent versus fighting feelings, but the standard deviation demonstrates that scores varied more so than clustering close to the average. The narrative data showed that half of the interviewees responded with pleasant or indulging feelings about this rhythm and half of them responded either with dislike or discomfort. This could be a corollary with the quantitative results in that the MEMBAS ratings did not tend to cluster around lower (more indulgent) scores of one or two. The most frequently occurring spontaneous words

stated by the participants after embodying the sucking rhythm was sooth(ing), relaxing, comforting, and good ($N = 17$). One person's spontaneous word was phrased, "this brought up a lot of emotions." Participants who used words aligned with discomfort-related feelings used words such as anxious, awkward, and bored ($N = 11$). Other spontaneous words were used but did not clearly fall into a category of pleasantness or unpleasantness of experience. Examples of such words include: bounce, rhythm, wave, airy, and easy.

Biting Rhythm

The biting rhythm's average ratings ($M = 3.75$, $SD = 1.62$) were similar to the sucking rhythm with only negligibly higher averages, reflecting more indulgent versus fighting feelings. Also similar to the sucking rhythm, the narrative data showed that half of the interviewees responded to the biting rhythm with pleasant or indulging feelings and half of them responded with discomfort. These latter interviewees used descriptive language that was notably more aggressive than the language used by the interviewees who felt fighting qualities in the sucking rhythm. For example, Donna said of the biting rhythm, "It feels rough and harsh, like we are hurting ourselves." Rena said, "It feels like someone biting, especially when enacted in the finger tips." Dave's remark could be interpreted as self-critical when he stated that this movement "reminded me of how fat I am." The most common spontaneous words stated by participants were energizing, focused, and controlled ($N = 19$). Some people reported words that identified with discomfort: anxious, tiring, and uncoordinated ($N = 10$).

Twisting Rhythm

The twisting rhythm's average ratings ($M = 2.9$, $SD = 1.46$) were slightly more indulgent than the sucking rhythm and almost one point more indulgent than the biting rhythm. Two of the interviewees used the word flirtatious to describe their experience. Lynn said, "I felt instantly flirtatious after doing this movement for two minutes!" Katie also stated feeling playful and flirtatious, "and I want to do those movements [again]. . . . That's a part of me that I had kind of let go," she said. Rena said this movement was her favorite movement, and that "'creativity' would be the catchphrase for this movement. . . . When I freestyle dance, I do a ton of this [movement]. I feel open and [like] a goddess!" David said that he "would never do this movement" but "it didn't feel bad," whereas Demarcus was reminded of his dance and movement history when embodying this rhythm. Donna, in contrast to Demarcus, reported, "It was disorganized and I couldn't make it a purposeful movement . . . for me, the twisting [movement] is uncomfortable." The words sensual and dreamy were the most frequently occurring spontaneous word choices by the participants. Four of the male participants used the word weird to describe their experience in this movement. This rhythm showed the most use of indulgent or pleasing feeling words stated spontaneously. Sultry, sensual, and dreamy ($N = 10$) were used frequently; playful, silly, carefree ($N = 9$) were used second most frequently. Other words used by different individuals include: lost, curious, relaxed, and baby.

Strain-Release Rhythm

The average ratings for the strain/release rhythm ($M = 4.55$, $SD = 1.7$) were the highest among the four rhythms. Since higher numbers reflect assertive or fighting

qualities, this outcome substantiates interviewees' experiences such as Demarcus, who said this movement had "maybe a little bit of a fighting quality. Not intimidating or anything, but it felt sort of ready to jump at something. It brought about a little bit of tense feelings and anxious feelings. I was ready for some sort of defensive response. It stuck with me after I did [that movement]." Donna's experience was similar when described the movement:

It has energy, determination, force, then it has all the other hopeless I give up and do I just quit or do I try it again [feeling]. [This movement] has a whole lot of feelings associated with it. [The holding part] makes me feel so angry and frustrated . . . and then [the sudden release afterwards], I think what am I going to do? It feels hopeless.

Katie described her experience of this rhythm as "releasing more relaxation . . . like progressive muscle relaxation." Lynn and Rena had similar experiences in responding positively to the feeling of the combination of tight holding and then releasing that tight hold abruptly. Lynn described how frustrated she has been at work lately, and that she was feeling some anger coming into the study today. But after doing the strain-release movement she said:

I felt so good. Just after a few repetitions! I needed it, I really needed to do this movement. It feels like a good contrast. It made me aware of my level of tension from going, going, going all day. So you do the movement and then let go. It feels so good to do the movements and then let it go.

Rena described the strain-release to "feel like I've grasped/held energy, it's going to change, and then that potentiality for [change] happens next [in the release]. It's a

comfortable feeling.” The most frequently stated spontaneous words by the participants was tense, frustrated, aggressive, and agitated ($N = 23$). Compared to the other rhythms, the strain–release clearly shows more similarity or agreement across individual spontaneous responses (43% of participants).

Comparison of Indulging Rhythms

Narrative data and spontaneous words stated after embodying each rhythm support the finding that the participants had very different internal responses to the sucking and twisting rhythms ($p < .05$). For Katie, the sucking rhythm felt “uncomfortable” and the twisting rhythm felt “playful and flirtatious.” David noted little distinction between the two and described both experiences as pleasant and that he “liked doing the movements.” Demarcus used brief descriptions such as “grounding and comforting” to describe the sucking rhythm whereas the twisting rhythm stimulated recall of his past experience as a breakdancer. Lynn described a significantly unpleasant experience of the sucking rhythm and, in contrast, experienced an instant feeling of flirtatiousness when embodying the twisting rhythm. Rena’s parallel experience was reflected in her immediate dislike and irritation elicited by the sucking rhythm in direct contrast with her “all time favorite movement of the four,” the twisting rhythm—her preferred movement for freeform dancing. Donna’s experience was contrary to both Rena’s and Lynn’s. Donna felt the movement to elicit “happy” feelings and “smoothing” sensations whereas she felt “uncomfortable” and “disorganized” when engaging in the twisting rhythm. The data show that the sucking rhythm facilitated responses that were clearly indicative either of comfort or discomfort, whereas the twisting rhythm was more

often responded to with pleasant feelings. Further elaboration of these indications will be presented in the Discussion section.

Comparison of Fighting Rhythms

There was statistical significance found between the ratings of the biting and strain/release rhythms ($p < .05$). Participants experienced distinguished affects between each of these two fighting quality movements. Further support for this finding was identified in the narrative data. Katie's response to the biting rhythm was, "I saw it as kid playful," whereas she experienced the strain/release movement as a release of tension. David did not report experiencing a marked difference between the two fighting rhythms. Demarcus, however, described the biting rhythm as somewhat "stimulating" whereas his experience of the strain-release rhythm was markedly different, "it brought about anxious, tense feelings." Lynn, too, experienced stimulation in the biting rhythm as she described it as "invigorating," in contrast to the strain/release rhythm which she referred to as the "angry" movement to embody as a way to channel and release pent up feelings of anger. Lynn said that she recalled using biting rhythm movements on her head frequently as a way to re-energize herself, however the biting movement in other parts of her body (like on her hands) felt like someone was slapping her hand as a corporal punishment. After embodying the strain-release movement, Lynn stated that it reminded her of harnessing and "anchoring" energy or clarity, as she stated doing often for the students in her energy healing classes. Donna said that the biting rhythm felt harsh and preferred it to be softened with light tapping, whereas the strain-release she felt qualities such as "frustration," "determination," "anger," and "hopelessness." For most participants, the themes of the biting spontaneous words were around clarity and energy

and arguably were less affect-oriented, whereas the strain/release spontaneous words reflected greater intensity of feeling state and emotional response.

CHAPTER 5

Discussion

Summary of the Study

This study was conducted to test a theoretical interpretation of psychological states influenced by dynamic body movements, the TFRs of the KMP. A sample of 53 nonclinical adult participants embodied four distinct rhythmic movements and then rated from a selection of word pairs on the MEMBAS scale how they felt after enacting each movement. Participants also completed the electronic version of Lane's (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990) Levels of Emotional Awareness Scale (LEAS) as a measure of self-awareness.

The design of the study was a mixed methods approach, where quantitative analyses of the four movements' (IV) effect on the MEMAS ratings (DV) were conducted; and qualitative narrative interview data were collected from six of the 53 participants. Repeated measures ANOVA were conducted testing for differences among the four rhythms, and a t-test was used to test for differences between the indulging movements and the fighting movements. A between-groups test of gender as a singular variable was also conducted, and results showed no statistical significance of gender's influence on MEMBAS score.

Major Findings

Results from this study confirmed previous findings by Koch (2014) that indulging or smooth-quality rhythmic movements elicited different affective responses from fighting or sharp-quality rhythmic movements. When individuals embodied smooth-quality movements, they rated feeling more indulgent feelings. Sharp-quality movements

were rated to elicit assertive or aggressive-type feelings in participants. Further, this study's findings suggest that even within the same category of movement (either smooth or sharp) there were differences in affective response elicited. Though the sucking rhythm and the twisting rhythm have smooth and indulgent qualities, there were differences in affective experience elicited by them when participants embodied and rated them. Similarly, the biting rhythm and strain–release rhythms are fighting rhythms with elements of sharp-type qualities. Yet, each of these rhythms was rated to elicit distinguishable affective experiences for the participants. These findings were supported by detailed subjective responses gleaned from the interviews with the six participants. For example, Demarcus felt comfort and soothing when engaging in the sucking rhythm, whereas he described distinct pleasant memories of dance performance when engaging in the twisting rhythm.

The qualitative interview data showed a major theme that rhythmic movements can elicit simultaneous complex responses. For example, Rena experienced different sensory, cognitive, and affective responses depending on where on her body her hands enacting the biting rhythm—on her head, the biting rhythm felt energizing and reminded her of similar movements that she enacts to stimulate mental clarity. In contrast, feeling the biting rhythm on her arms and hands reminded Rena of being a child and having her hand slapped in punishment by an adult figure. The movement itself elicited a specific response in her, part of the body experiencing the rhythm impacted the movement's effect, and thought associations followed in greater detail when performing the movements. This phenomenon was reiterated in the subjective experiences of the other interviewees, whose experiences were detailed previously.

Two sub-themes were also drawn from the interview data. One sub-theme identified was that movements elicited memories in the participants. Lynn instantly recalled frustrating interactions at her work place when embodying the strain-release rhythm. She followed this statement by observing, “Wow, this movement reminds me that I would really like to return to therapy.” Lynn reported that she had been working with a psychotherapist who was also a dance/movement therapist and that she had “forgotten how helpful [doing movement] was.” Past memories were evoked, but so, too, were self-directed observations such as Lynn’s. David also remarked about his insecurity with his weight being “reminded” of his dissatisfaction. A measure of awareness increased after engaging in the rhythms.

A second sub-theme identified was the intensity of response elicited by the rhythms, most notably the sucking rhythm. This rhythm showed the strongest responses, either with pleasant or unpleasant feelings or associations. Half of the interviewees reported feeling some measure of discomfort with the sucking rhythm and the other half reported feeling comfort. Lynn’s response to this rhythm demonstrated both the complexity of experience and the strength in affective response when she said, “this rhythm feels very soothing and nurturing, but I’m currently in an angry mood so when I do this movement it just feels irritating and makes [my frustration] worse because I don’t want to be soothed right now. I want to do aggressive, angry movements right now! So, the movement itself I would describe as soothing, but how I feel right now doing it is irritated.”

Interpretation of Findings

Constructing this study as a mixed-method design showed to be highly valuable in expanding understanding of rhythmic movement beyond scaled ratings. In particular, Lynn's description of her experience with the sucking rhythm was compelling in that it pointed toward the multi-layered experience a singular movement can elicit and, also, that limiting a participant to a singular word to describe their affective experience does not tell the complete story of their subjective experience of rhythmic movement. Making connections to developmental psychology and associations of the four TFRs studied with the first two years of life, it is interesting that memories elicited related to early childhood for some interviewees. In the free words stated, a few participants used the word baby or child as their spontaneous word. Given that early interactions with caregivers are known to play a vital role in relational development, one could speculate that such contrasting responses to the sucking rhythm could have some measure of reflection of the person's feelings about their early intersubjective experiences.

The findings of this study provide preliminary data demonstrating that not only can dynamic or rhythmic body movements influence affect state, but also that rhythmic patterns within the same category of quality (e.g. indulging) differ in the affective responses they can induce. First, this is important initial evidence supporting the KMP's theoretical approach to rhythmic movement taxonomy, a useful step toward validating a part of this system of movement analysis. That dynamic rhythmic movements can be classified into characteristic qualities and facilitate different affective states is a finding that has implications for dance/movement and body-oriented therapists who use rhythmic movement as an assessment and intervention strategy, as well as expressive therapists

who incorporate rhythm as a resource for affect change. By specifying *type* of tension flow rhythmic movement either observed in a client or initiated with a client, affective responses could be better understood, explored, or facilitated.

Connection to Other Research

One connection to extant research in developmental neurology and the identification of rhythmic body movement patterns is the descriptions of the origins of the TFRs and polyvagal theory and the bidirectionality of body and brain communication discussed in the literature review of this paper. In her early work, Kestenberg (1967) postulated:

A comparison of motor rhythms with rhythms of autonomic responses (heart rate, blood pressure, respiration, etc.) would be helpful in examining the possibility that there is a central regulation of rhythms specific to processes of discharge of particular component drives, as hinted by Freud and Breuer [1917]. Rhythms of discharge through various channels need to be correlated with rhythms of stimuli which, according to Freud, may explain the physiological substrate of affects [1965]. (p. 33)

Not only did Kestenberg speculate about the biological substrate of affective experience but also, she addressed infant-parent attachment and the use of TFRs to create attunement experiences between mother and child in a reciprocal sharing of individual proclivities for rhythms. One example of this exchange is in the sucking rhythm seen in nursing an infant:

There is something contagious about rhythmic repetition, especially when there is an intimate contact between two bodies. With the help of his

mother, the infant learns to apply rhythms in an optimal “pure” way, at a time, when and, in a zone, where they are biologically most advantageous. Thus the sucking rhythm called for during nursing becomes synchronized with the frequency of maternal milk expulsion. At the same time, maternal and infantile movements display an oral rhythm in rocking, fingering, tapping, and breathing (p. 14).

These observations made decades ago by Kestenberg share interesting parallels with polyvagal theory (Porges, 2001, 2011) and its tenets that the autonomic nervous system, particularly the myelinated vagus nerve, plays a key role in affect state and social behavior referred to as the body’s social engagement system. Further, polyvagal theory supports the bidirectionality of regulation of the autonomic nervous system—that the brain’s circuits communicate with and influence the body’s state of being and, conversely, the body’s state of being directly influences brain circuitry. In fact, changes in the body state or body movement have a direct effect on the autonomic nervous system, providing neurobiological support for the conscious use of body movement to create positive psychological change. An intriguing recommendation, polyvagal theory specifically refers to rhythmic body movements as a source of creating a healthy nervous system but also as therapeutic interventions for people whose social engagement system has been disrupted through trauma or conditions such as autism:

We can infer from the specific neural mechanisms related to the effectiveness that feeding and rocking have on promoting calm behavioral and visceral states. Specifically, both the ingestive behaviors associated with feeding and the passive rocking of an infant promote calmness by influencing the myelinated vagus. Feeding activates the muscles of

mastication via trigeminal efferent pathways, which, in turn, provide afferent feedback input to the nucleus ambiguus (i.e., the source nucleus of the myelinated vagus).

Rocking provides an efficient and direct influence on the vagus by stimulating vagal afferent pathways via the baroreceptors. Moreover, activation of the social engagement system dampens the neural circuits including the limbic structures that support fight, flight, or freeze behaviors (Porges, 2011, p. 190).

Rocking movements and swaying movements were reported to stimulate the vagus nerve and thusly recommended by polyvagal theory as motor interventions that regulate blood pressure. Further research into the different TFRs and implications for autonomic regulation and intersubjectivity are also implied by these connections and could be fascinating follow-up studies.

The findings in this study could be beneficial for music, drama, art and other creative arts therapists who incorporate different iterations of rhythm into their clinical praxis. Rhythm in music therapy often has focused on rhythm through auditory stimulation, vocalization, or instrument playing (Kossak, 2015; Delafield-Butt & Trevarthen, 2015), however incorporation of an understanding of rhythmic movement qualities may further support interventions that include a kinesthetic component with theoretical grounding to describe and implement affective change. Identifying different rhythmic movements may be a resource for therapists seeking to structure their rhythmic interventions and include a developmental paradigm into their treatment focus. KMP rhythms have been recommended for use in dance/movement therapy to promote attunement, mirroring, and developmental movement interventions (Loman & Sossin, 2009). The preliminary findings provide support for use of the TFRs to connect to

distinctive intrapsychic material that can be accessed through embodying specific repeated rhythmic patterns of movement.

Limitations and Further Research

This study was based on a random sampling of participants representing two geographic regions of the continental United States, and only those who had access to the study's advertisement flyers via university posts and social media posts to the researcher's immediate and extended community. Future studies may expand the sampling to include more heterogeneous demographics and a balanced representation of males and females. While both males and females comprise the group of participants in this study, they were not equally represented. It is important to acknowledge that the adaptation of the MBAS (Koch & Muller, 2007) to the MEMBAS used in this study could also pose a limitation. Perhaps other tools could be developed to be further targeted in measuring cognitive and affective responses elicited by subtle or gross changes in rhythmic movement embodiment. The researcher also acknowledges her personal bias in that she is an educator and expert in the KMP theory and system. With this reality in mind, the researcher exercised impartiality to the best of her awareness throughout the course of the data collection, analyses, and interpretations. This study will perhaps inspire others to expand on the results and continue to examine and understand theoretical frameworks for psychomotor assessment and, in particular, the KMP.

This study was a preliminary exploration of four of the 10 TFRs, so there remains need for further research into the theoretical psychological associations of the additional six TFRs. The internal validity of the research was supported by the inclusion of the baseline MEMBAS, the counterbalancing of the introduction of the stimuli to address

order effects, and the centering exercise between each movement task to address carry-over effects. External validity of the study was supported by the recruitment, collection, and analysis of demographic data sufficient to describe the sample in terms of age, sex, and identified gender. Not all participants reported an identified nationality, so this information was missing from evaluation. Therefore, there is limitation in generalization of the study's results to different groups of nationalities.

Since ethnicity or nationality was missing from this study, future studies can incorporate this information to further understanding of how different dynamic rhythmic movements can be experienced by individuals representing multi-ethnic and cultural locations and backgrounds.

Conclusion

Different qualities of rhythmic movements can elicit different affective experiences in adults. This finding connects to the clear indication of the use of rhythm as a resource for personal and interpersonal insight on a continuum of levels, from neurobiological to interpersonal, and fetal stages through later life (Koch, 2014, Koch & Helena, 2017; Loman, 1994; Porges, 2001; Trevarthen, 2005). Biological processes are determined by their rhythmic capacity and stability, such as the predictive rhythm of heartbeat and respiration (Varga & Heck, 2017). The internal rhythms of the human body extend to rhythmic movements expressed in the head, hands, limbs, and whole body (Koch, 2014). The infant takes in milk through the sucking rhythm and demonstrates these movements in mutual caress of the mother during nursing. Interactions between caregiver and child have a rhythmic or musical quality (Trevarthen, 2005; 1999) that marks intersubjectivity and the reflection of the bonding and attachment process. A

decade ago, researchers attested that “developmental and psychological studies of rhythms, as they are manifest across modalities of physical experience and perception will further inform therapists interested in the intrapersonal and relational regulatory processes these rhythms serve” (Sossin & Sossin-Charone, 2007, p. 271). This study addressed that assumption by appreciating the rhythmic nature of human life and relationality and, further, the preliminary notion that subtle changes in type or quality of rhythmic body movement can notably influence intrapersonal emotional experience.

APPENDIX A

FLYER TO ADVERTISE VOLUNTEERS SOUGHT FOR RESEARCH STUDY

★RESEARCH VOLUNTEERS NEEDED★

Seeking adult men and women ages 18+ to participate in a doctoral research study about your perceptions of different low-impact body movements.



What will I have to do?

*A one-time, 45-minute session, doing 4 different rhythmic movements and completing a survey after each movement

Where and when will it be?

*On the Lesley University campus

*A convenient time that fits your schedule

Who can I contact to get more information about the study?

*Melanie Johnson, student researcher
Lesley University PhD Candidate
mjohns42@lesley.edu

Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839	Posture study Contact: mjohns42@lesley.edu 913-302-4839
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APPENDIX B

INFORMED CONSENT FORM

Informed Consent Form:
Study of Rhythmic Movements and Feeling States
A PhD Dissertation Research Study
Lesley University

Principal Investigator: *Melanie Johnson, PhD Candidate*, co-researcher, *Dr. Robyn F. Cruz*, PhD program in Expressive Therapies, Lesley University

You are being asked to volunteer in this study to assist in my doctoral research on rhythmic movements and feeling states. The purpose of the study is to understand how people's feelings might or might not be affected by different kinds of body movements found in human development.

For this study, you will be asked to complete a brief electronic self-assessment of emotional awareness, and then a brief scale about how you are feeling right now. Following this, you will be asked to view four different video clips of a person performing a low impact movement and to mimic the movements you see on the screen for one min. After performing each movement, you will be given a self-assessment survey to indicate how you are feeling now. This procedure will be repeated for all of the four movement qualities. The duration of the entire study is estimated to be no more than 60 min. You may be asked to participate in a brief interview with myself right after completing the movement tasks. In this interview, you will be asked to describe in as much detail as possible how you experienced each of the movements that you performed. Should you consent to participate all of your personal information will be kept

confidential and a pseudonym will be used when reporting the results of the study. With your permission, I may contact you to confirm what is reported to ensure that it is accurate to your reporting and to ensure your privacy when reporting the final results.

You will be personally interacting with only myself as the principal researcher.

This research project is anticipated to be finished by approximately May 2018.

I, _____, consent to participate in each of the tasks in this study as described above. I understand that:

- I am volunteering to participate in a self-assessment test, low impact movements, and a feelings self-assessment
- My responses are true and accurate to me
- I will be asked to provide information about my age, sex, nationality, race
- Session will last approximately 60-80 min
- My identity will be protected
- Session materials, including interview data, audiotape recordings, and test results will be kept confidential and used anonymously only, for purposes of supervision, presentation and/or publication.
- If I participate in the post-movement interview, I will be asked to provide information about thoughts, feelings, overall responses to this experience.

- The session may bring up feelings, thoughts, memories, and physical sensations. Therefore, possible emotional reactions are to be expected, however, I am free to end the session at any time. If I find that I have severe distress, I will be provided with resources and referrals to assist me, and will not lose any benefits that I might otherwise gain by staying in the study.

- This study will not necessarily provide any benefits to me. However, I may experience increased self-knowledge and other personal insights that I may

be able to use in my daily life. The results of the study may also help to increase public and professional knowledge about the relationship between the body and the mind.

- The audio recordings, transcripts, and survey results will be kept in a locked file for 5 years and then destroyed.
- I may choose to withdraw from the study at any time with no negative consequences.

Confidentiality, Privacy and Anonymity:

*You have the right to remain anonymous. If you elect to remain anonymous, we will keep your records private and confidential **to the extent allowed by law**. We will use pseudonym identifiers rather than your name on study records. Your name and other facts that might identify you will not appear when we present this study or publish its results.*

If for some reason you do not wish to remain anonymous, you may specifically authorize the use of material that would identify you as a subject in the experiment. You can contact my advisor Dr. Robyn Cruz at rcruz@lesley.edu with any additional questions.

You may also contact the Lesley University Human Subjects Committee Co-Chairs (see below)

You will be given a copy of this consent form to keep.

a) Investigator's Signature:

Date

Print Name

Investigator's Signature

b) Participant's Signature:

I am 18 years of age or older. The nature and purpose of this research have been satisfactorily explained to me and I agree to become a participant in the study as described above. I understand that I am free to discontinue participation at any time if I so choose, and that the investigator will gladly answer any questions that arise during the course of the research.

Date

Print Name

Participant's Signature

There is a Standing Committee for Human Subjects in Research at Lesley University to which complaints or problems concerning any research project may, and should, be reported if they arise. Contact the Committee Co-Chairs irb@lesley.edu at Lesley University, 29 Everett Street, Cambridge Massachusetts, 02138.

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