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A Study of Torso Movements To Assess The Use of Movement Awareness In Piano Pedagogy

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ABSTRACT

The purpose of the study was to investigate the possibility of using movement awareness to enhance piano pedagogy. A "bridge" was created to link the abstract qualities of movement awareness to the concrete movements of the pianist at the keyboard. Utilizing music examples and body movement within the torso, a teaching approach was presented which could be used to assist teachers in presenting this concept to students.

After a brief look at the changing role of body movements in piano pedagogy, a general overview of human anatomy was presented. Following this, an in-depth discussion of movement for three particular areas of the torso was discussed. Emphasis was placed on how to adapt scales and composed music excerpts to create an awareness of movement within the torso areas of the spine, pelvis, and shoulders. Music examples were kept at a basic level to make the approach applicable to a wide range of students.

Concluding questions focused on the possible benefits of a basic background in movement awareness, and how they could be best promoted for the good of students.

A STUDY OF TORSO MOVEMENTS TO ASSESS THE USE OF MOVEMENT AWARENESS IN PIANO PEDAGOGY

INTRODUCTION

In the first half of this century, pianists began to recognize the importance of whole-body movement as a factor in musical expression. Traditionally, movement had been restricted to the small playing units directly responsible in the production of music, the fingers, hands, and forearms. Pianists were encouraged to keep the remainder of the body as still as possible. Movement within the upper arms, shoulders and torso was considered detrimental to the production of "good" keyboard music.

The move toward a more comprehensive focus on the body began with the teachings of Ludwig Deppe (1828-1890) and the introduction of weight-control technique[1]. He believed that both small and large playing units worked together, and stressed the importance of being conscious of all action. He taught that movement was the natural outgrowth of the music itself and that it was fused inseparably with tone production. The writings of Rudolf Maria Breithaupt (1873-1945) and Tobias Matthay (1858-1945) promoted the ideas of this new school, adding support to the concept that larger playing units were essential to good music.[2]

Strong support for the integration of large playing units followed with the writings of Abby Whiteside (1881-1956). A student of anatomy and body mechanics, she contended that a pianist had to maintain total coordination throughout the entire body to capture the rhythmic flow of good sound production. In particular she placed special attention on the pelvis and buttocks, and the torso as a whole.[3]

Scientific studies on the movement of pianists were conducted by Otto Rudolf Ortmann (1899-1979) and Arnold Schultz (1903-1972). The removal of some of the subjectiveness from piano pedagogy helped clarify many aspects of how the body moved when at the keyboard. These studies, using a

scientific approach to understand movement, supported the concept that all body parts, large and small playing units alike, were dependent on each other for the production of music.[4]

One hundred years of combined influences has permanently changed the direction of piano technique philosophy. The concept of larger playing units, as an essential aspect of "good" musical expression, has now been firmly established. A significant difference with this new philosophy, however, is that it is applicable to all pianists, regardless of which "school" one belongs to. Not intended as a technique to challenge others, it is rather a concept to supplement and improve established methods of teaching.

Purpose of the Study

The value of this whole-body philosophy is not easy for many performers to recognize. Compared to the movement of the hands and fingers, distinct movement within the torso can be relatively difficult to detect. Before the integration of ones entire body can be fully grasped, one must be fully aware of these movements.

Techniques have been developed to teach the general public how to be self-aware of movements. Some, such as the Feldenkrais Method and the Alexander Technique are relatively new, Western developments. Others, though, such as somatic yoga, have been available for a long time. In general, this type of training is intended to help a person recognize faults in personal movement patterns and assist in finding ways to correct them. These techniques, though, are generally not oriented toward a particular profession, but rather are intended to improve general health and well-being. Their aim is a reeducation of the mind and body into a whole-life awareness.

Several movement awareness programs have promoted techniques claiming their virtues are applicable to the musician. Based on the musician being a human being, and the techniques designed for human beings, this logic is correct. While many of the techniques can be beneficial to the pianist, most, however, do not specifically apply to a pianist's life. Because of this, it is often difficult for a pianist to realize which movements are directly applicable to the piano. Programs demonstrate how to be aware

after one realizes the need to be aware, but not what movements one needs to be aware of. All too often this realization comes only as a result of injury. The desire to be aware is as a cure rather than a preventative.

To recognize the importance of a particular movement the pianist must be able to "see" its direct application to the piano. It is easy for a dance instructor to show a student the importance of movement in dance patterns. It is not so easy with the pianist. Piano pedagogy needs a "bridge" linking the philosophies of movement awareness directly to the actions of the performer at the keyboard. It must be a "hands-on approach" which is both clear and obvious, and structured to make awareness an integral part of regular practice. Piano teachers should have a way to demonstrate the direct application of movement and awareness to the piano.

The author hopes to demonstrate the direct application of movement awareness to the piano through a simple, straightforward, teaching approach. This approach will show how scales and composed music excerpts can be adapted and arranged to teach a fundamental level of awareness. The level will be basic enough to allow its effective use with most present-day piano teaching techniques.

MOVEMENT AWARENESS

Body Anatomy

A knowledge of body mechanics is useful for a thorough understanding of movement awareness. Though a comprehensive understanding may not be practical for most musicians, it is important to possess at least a basic knowledge of the human body's structural make-up. How one chooses to learn about the body is up to the individual. Whether one chooses to take a movement awareness course, a college anatomy course, or study on their own, it is important that they do. The better body mechanics are understood, the sharper the awareness, and the greater the benefits.

The limited scope of this paper does not allow for a comprehensive discussion on body anatomy. This must be left to the individual. Simplified explanations will be presented for the spine, pelvis,

buttocks, and shoulders.[5] Functional, working definitions will be provided for the general areas of the "spine-pelvis", "buttocks-pelvis", and "shoulders". These definitions will apply to how the terms are to be used for the purposes of this paper.

Spine

The spine, or backbone, is constructed of a series of small bones, or vertebrae, arranged one on top of the other and connected to each other by thin layers of tissue. This column is aligned as an alternating series of forward and backward-shaped curves. Running the full length of the torso, beginning at the base of the skull and terminating at the top of the pelvis, the spine is composed of both moveable and fixed vertebrae. The first group allows for movement along the spine, while the fixed vertebrae help form the stable base where the spine attaches itself to the pelvis.

For the purposes of this paper we are concerned only with the fixed vertebrae and the role they play as a base for the spine. The term "spine-pelvis" is used in reference to the general area where the base of the spine joins with the pelvic girdle, allowing the two to move in unison.

Pelvis

The pelvis is saucer-like in shape and constructed primarily of two, large, multi-sectioned hip bones. These two bones, situated parallel to each other and connected in front and back, collectively make what is often known as the pelvic girdle. Located at the lowest part of our torso, this structure acts as a stable meeting base for the upper and lower bodies. It is also the location of the body's center of gravity.

Among having other functions, the specialized make-up of the pelvis allows for the smooth rocking motion as one leans backwards and forwards. This is accomplished through the shape of the hip bones, which are slightly rounded on the bottom.

Buttocks

The buttocks are the fleshy, rounded parts of the body at the back of the hips. The term "pelvis-buttocks" will refer to the combination of the pelvis bone structure and the soft tissues of the buttocks.

Shoulders

The shoulders consist of two pairs of two bones, a long, narrow one across the front and a triangular one to the back. Collectively they form what is known as the shoulder girdle. The large bone of the upper arm is joined to this girdle as a ball and socket joint. This specialized joint allows the arm to range through three separate planes of movement, left to right, front to back, and top to bottom.

Some instructors of movement awareness feel the word shoulder is too ill-defined to be used accurately. They prefer the term upper torso. While some consider the arm attached to the shoulder at the arm socket, others consider the arm, shoulder socket and shoulder blade all part of the "arm", which is then attached to the upper torso. A direct consequence of this difference is that the former believe the arm has three joints (wrist, elbow, shoulder socket) and the latter four (the former three, plus where the collarbone and chest bone join).[6] This differing of opinions is not an issue of definition, but one of movement awareness. For the purposes of this paper, movement in the "shoulders" will refer to movement in the area of the upper arm, shoulder socket, and shoulder girdle. No attempt will be made to differentiate beyond this general category.

Adaption of Awareness Techniques to the Piano Keyboard

Music examples have been chosen based on playing level and obviousness of movement. The ability level required to play most pieces has been kept at the intermediate level, or below. This allows the player's attention to focus on the movement. Pieces have also been chosen which demonstrate a particular movement as obvious as possible. Because no motion works independently, most pieces will show more than one movement. For the purpose of clear, understandable explanations, however, an attempt has been made to isolate individual movements and examine each independently. Most pieces, therefore, will have a single movement which is the most apparent.

Each division uses selected excerpts from composed music, scales and arpeggios, chromatic scales, or a combination of the three. The pieces are arranged to facilitate "pulling" the student into the concept of self-awareness. It must be stressed that the purpose of each discussion is to bring the actual

movement into focus, not to teach "proper" movement or "proper" degree of movement. Each individual is different, but regardless of style there is a definite motion that one needs to be aware of. The order is designed to create the greatest maximum benefit, but is flexible enough to allow teachers the freedom to modify and adapt.

The final passage is designed to demonstrate the integration of the "isolated" movements identified in "Spine-Pelvis", "Pelvis-Buttocks", and "Shoulders". It will be used to remind the students that in reality the torso moves as a single, combined unit.

"Spine-Pelvis"

Chromatic scale in contrary motion beginning on c^1 will be the main music example used to create movement awareness in "Spine-Pelvis". It will be utilized two ways. First, it will be played with symmetrical arm extensions alone to emphasize the effects of range, and second, with the addition of dynamics to emphasize the effects of dynamic fluctuation. To facilitate this approach, the scale will be used three different ways and labeled according to the range of octaves played. Passages utilizing a range of two octaves will be denoted as (2), those using a range of four octaves will be denoted as (4), and those using a range of six, (6). Each will range equally to both sides of c^1. For example, a (2) will range one octave up and one down, a (4) will range two octaves up and two down, and a (6) will range three up and three down.

A suggested order of presentation to help "pull" the student into the awareness would be:

First - chromatic scales with symmetrical arm extension played in a (2)-(4)-(6)-(2) sequence

Second - chromatic scales with the addition of dynamic fluctuations played in a (6)-(4)-(2)-(6) sequence

Third - variations of the second format

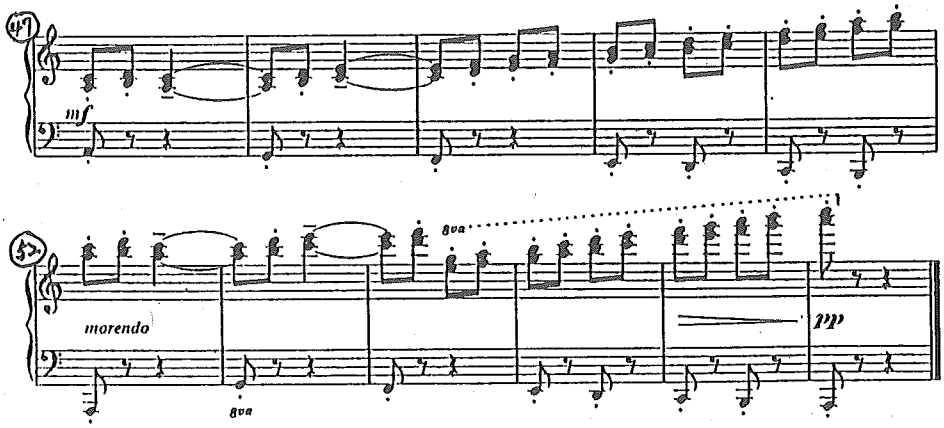
Fourth - composed music

When using only symmetrical arm extension, the idea is that as the range expands, the leaning-forward movement of the "spine-pelvis" becomes more and more obvious. Play using a consistent dynamic volume throughout the chromatic scale. The dynamic level chosen is not important. The important aspect is to keep the dynamic level constant. Play the scales in the following order: (2)-(4)-(6)-(2). Starting with (2), the students may not realize any movement, but by playing (4), and then (6), it should become quite obvious. Once it becomes obvious, (2) can be repeated in an attempt to gain a sense of subtle movements.

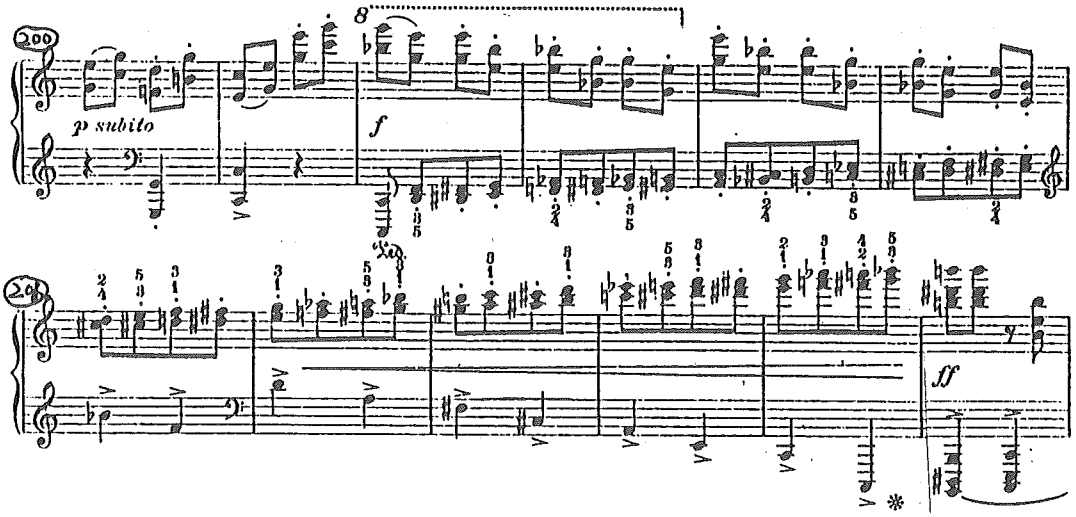
The addition of dynamics should further exaggerate the forward-leaning movement created by range increases. When adding dynamic fluctuations, use crescendos and decrescendos to accomplish the changes. Start with *pp* in the "center" of each passage, increase to *ff* at the far reaches, then return to *pp* when returning to the "center". For the greatest effect, the sequence should be (6)-(4)-(2)-(6). Because the sequence for symmetrical arm extensions without dynamics has already been experienced, the student can begin with (6) (most obvious), move to (2) (least obvious), and then finish again with (6).

Experimenting with variations of symmetrical arm extensions with dynamic fluctuations, students can attempt to sense the more subtle movements of the "spine-pelvis". One variation might be to play scale (6) in a sequence of first all *pp*, then all *f* or *p*, then all *ff*.[7] Another would be to play scale (6) by beginning with crescendo and ending with decrescendo and then playing vice versa.

After playing the chromatic scale sequences, have the students play the following music selections. These composed pieces will strengthen and emphasize the "learned" awareness. The first piece is simpler, but less traditional, while the second is more difficult, but more traditional. No special commentary should be necessary if the student has first worked through the chromatic scale sequences. Allow the student to experience the movements on his/her own.



David Karp, Whirling Winds, meas. 47 to 57



Ernst von Dohnanyi, Rhapsody in C Major, meas. 200 to 211

"Pelvis-Buttocks"

A combination of scales, arpeggios, and composed music will be used to develop movement awareness in "Pelvis-Buttocks". Presented as three sets of paired examples, each deals primarily with the

effects of keyboard range. The three sets are Scales & Arpeggios, Range to the Right Using Composed Music, and Range to the Left Using Composed Music. The second and third sets use excerpts from composed pieces to complement each other. The first piece of each set is intended to demonstrate subtle movements which occur often in pieces, while the second piece is selected because of its obviousness of movement. The set Scales & Arpeggios uses B-major. Any scale could be used, but B-major was chosen because of its convenience of fingering and it having the most natural and relaxing finger patterns. The pairing of scales and arpeggios is structured differently, using a total of six examples. Separate L.H. and separate R.H. for scales is paired with the same for arpeggios. In addition, two possible variations are presented. The pairings of scales and arpeggios is a contrast in obviousness as well as difficulty.

Scales and arpeggios are very useful because their natural construction allows a pianist to move through the full range of the keyboard in a continuous, fluid motion. During playing, two major variables influence the "pelvis-buttocks" movement, separate hands versus two hands and speed. Both factors have, as their foundation, the need to maintain sufficient space between the upper arm and upper body as the range changes. Playing scales with two hands may produce a slightly greater degree of movement, but the perception of movement is often greater when playing separate hands. Also, the ability to concentrate on the movement itself is often improved when playing separate hands. This perception, and increased concentration, is of greater value than the actual increased movement.

While separate hands versus two hands is a factor with scales, speed is the factor with arpeggios. The addition of speed to arpeggios creates both a perceived benefit and an actual benefit. The perceived benefit is created because the faster one moves through the passage, the quicker, hence more obvious, the movement becomes. This could be applicable to most music, but it seems even more apparent with arpeggios. Perhaps more important to movement awareness, however, is the real increase in movement found when performing a faster arpeggio. Though the actual keyboard range stays constant regardless of the speed, the "pelvis-buttocks" must lean farther to one side or the other to compensate for the greater need in control and accuracy.

The suggested order of presentation is to begin with scales, both L.H. and R.H., then move to arpeggios, L.H. and R.H. The inclusion of variations e) and f) is optional.

a) Scale - separate hands (L.H.), slow (♩ = 55)

b) Scale - separate hands (R.H.), slow

c) Arpeggio - separate hands (L.H.), slow (♩ = 40)

d) Arpeggio - separate hands (R.H.), slow

e) Scale - two hands

f) Arpeggio - fast(er)

1) Scales & Arpeggios

a) B-major scale - separate hands (L.H.), slow

Start with the left hand and progress through the scale from low to high. Initially, as the keys in front of the pianist are depressed, there may be very minimal movement, but gradually one should feel the left buttocks rise slightly as the pianist is "pulled" into the higher keys. This will increase as the pianist simultaneously plays the upper notes and readjusts his/her body position to maintain a comfortable left upper arm/left upper body spacing. Returning to the central position, the pianist will feel the body right itself. This may be the time when the actual amount of movement can be best recognized.

b) B-major scale - separate hands (R.H.), slow

Play the scale, but this time use the right hand and progress in the opposite direction, from high to low. The same sensations of motion should be recognizable, but from the opposite side.

c) B-major arpeggio - separate hands (L.H.), slow

The concept for both arpeggio exercises is the same as that used with the scale examples. A significant difference, however, will be noticed in the obviousness of movement. This increase will, for most students, be a direct result of needing more upper arm/upper body space adjustments because of the increased thumb action.

d) B-major arpeggio - separate hands (R.H.), slow

e) B-major scale - two hands

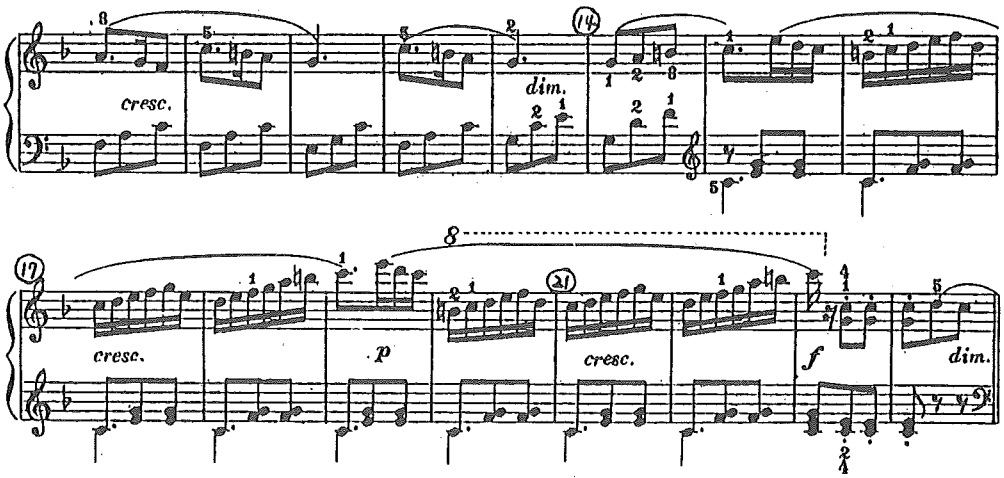
By using both hands, a rocking motion is incurred. The student be-comes aware of the space and movement on the right (left) side as he/she begins and the corresponding space and movement on the opposite side as the scale finishes.

f) B-major arpeggio - fast(er)

The speed at which this can be played depends on the individual student. The faster the arpeggio can be played, the greater the potential for awareness.

2) Range to the Right Side Using Composed Music

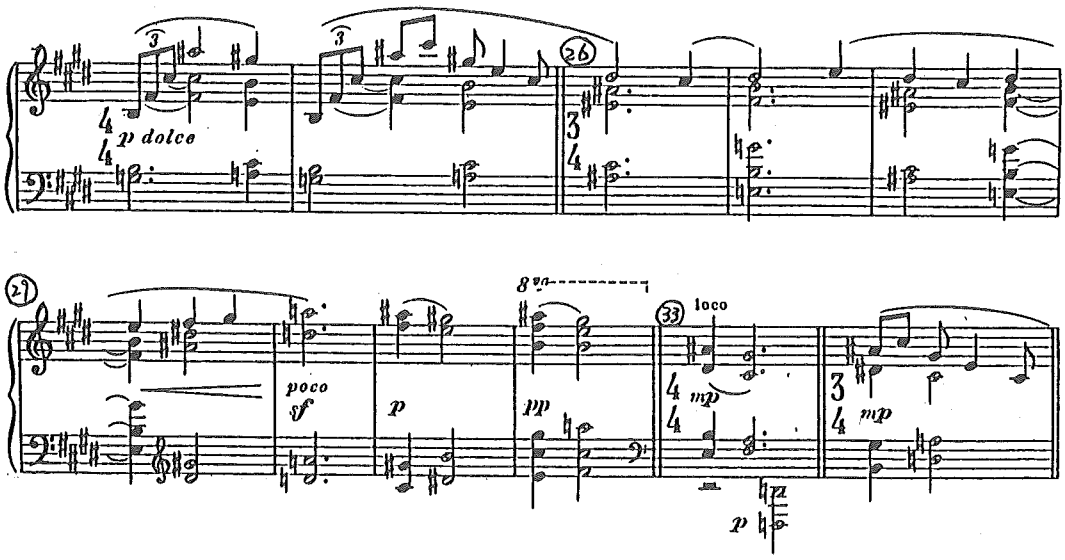
a) Ferdinand Beyer, Beyer, No.104, meas. 14-24



The left hand stays in the same position throughout the entire selection while the right hand gradually moves scale-like up to c^4. Movement in the buttocks region is subtle, so many players may consider the movement only that of extending one's arm.

After the student has worked through all the examples, and has gained a greater sense of awareness, this passage can be repeated to experience its more subtle movements.

b) Richard Cumming, Twenty-Four Preludes, No. 4, meas. 26-33



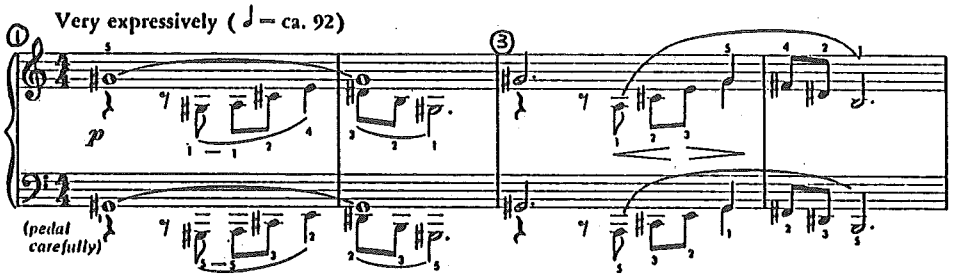
Though the highest note in this selection is a#^{3}, which is only two notes lower than the highest note in the Beyer piece, this example will show how range is not always the deciding factor in buttocks movement.

The L.H. position of the two chords in measure 32 indicates that the player must move to his/her right side to create a sufficient/comfortable spacing between the left upper arm and the left upper torso in order to play the chords well.

To play the next measure (measure 33) the player must shift back to the original position at the center of the keyboard. This relatively quick transition from measure 32 to measure 33 draws obvious attention to the amount of actual movement that occurred in the buttocks when the player played to the right side of the keyboard in the previous measures.

3) Range to the Left Side Using Composed Music

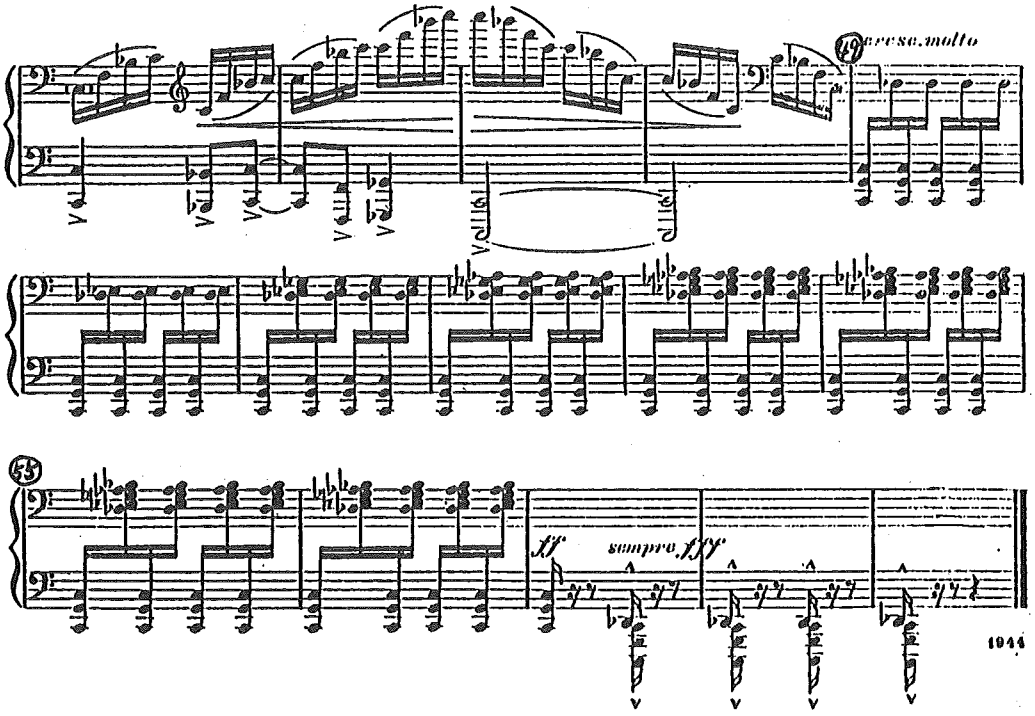
a) Richard Faith, Long Ago, meas. 1-4



This piece is similar to the Beyer piece in its lack of obvious movement in the buttocks. In particular, this lack of movement may be most apparent to players with the advantage of long arms.

A significant difference, however, is in the preparation to play. Rather than gradually moving into the movement, the player must prepare by leaning to the left for the opening L.H. G#[1].

b) Alberto Ginastera, Tribute to Roberto Garcia Morillo, meas. 49-57



The concept of range and arm space is similar to that in Twenty-Four Preludes, No. 4, but the application is different. The L.H. chord is slightly higher than the lowest note in Long Ago, and kept for the entire 8 measures. The R.H. starting note is only a half step higher then the L.H. notes, and though the fingering changes, its relative position on the keyboard stays constant. These two factors give the appearance of having no need to move the body.

However, the R.H. fingering sequence effects movement, pulling the body gradually to the left side. As fingers are added, moving from "1" up to the full complement of "5", the buttocks leans more and more to the left to maintain a comfortable spacing between the right upper arm and the right upper torso.

"Shoulders"

Movement awareness in the shoulder region will be created differently than as was done with "Spine-Pelvis" and "Pelvis-Buttocks". With the first two, there was a direct correlation between the performed music and the motion being examined. Playing the music examples produced the desired movement. With "Shoulders", however, the presentation is a "3-step" process. Whole-arm motion is the intermediate motion between the music and the movements of "contraction and expansion" in the shoulders.

MUSIC PLAYED ----->

WHOLE-ARM MOVEMENT (hand, forearm,

and upper arm as a complete unit) ----->

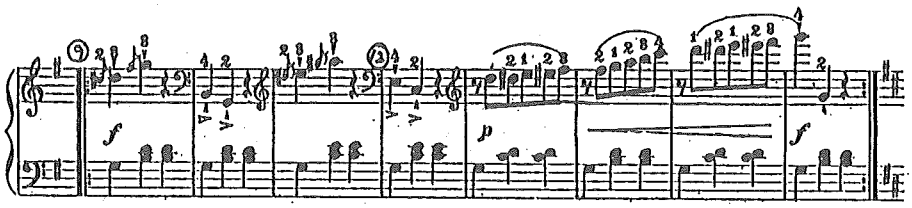
SHOULDER MOVEMENT ("contraction and expansion")

The medium chosen to create the intermediate step of whole-arm movement is a combination of crossing-hands and range jumps. It is important to remember that the role of this medium is only to create a setting which makes shoulder movement obvious. The student should not concentrate on the action of the arms, but on the movement that is being created in the shoulders. Crossing-hands and range jumps are solely the means to create this action.

A second significant difference with "Shoulders" is that scales are not used. Due to the unique mobility of the arm sockets, composed pieces are better suited. The subtleness of the many, various forms of movement in the shoulder region, and the difficulty of separating each into a distinct movement, allows composed music, with its greater mix of actions, to best be exploited for the purposes of explanation. Also, the music examples are not paired or grouped by special category. Five pieces are presented randomly, each with separate explanations.

Movement awareness in "Shoulders" will concentrate on two basic actions, "contraction and expansion".[8] "Contraction" will refer to the motion of the shoulders which allows the hands and arms to move from an outward position to inward along the keyboard, and "expansion" in the opposite direction inward to outward along the keyboard. When the music examples are played, the movements in each should be thought of in degrees of intensity. No one piece should be considered totally "contraction" or "expansion", even if one or the other dominates. It is important to emphasized the correct understanding of the movements being used to create "contraction and expansion". The motions of crossing-hands and range jumps is more than the movement of just the hands and forearms, but also the upper arms and shoulders.

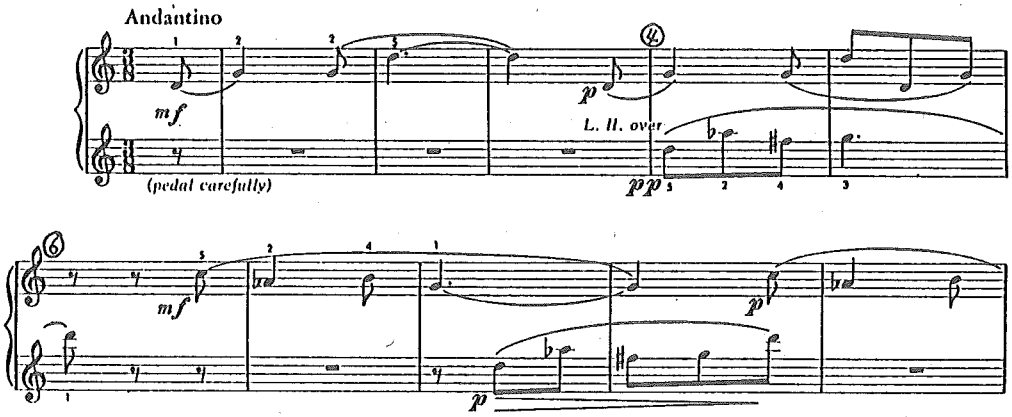
1) Ferdinand Beyer, Beyer, No. 80, meas. 9-12



When the right hand plays measure 10, down to bass clef B & G, the pianist should be able to experience a "pulling" feeling in the region of the right shoulder. The intensity of the sensation should be greater than that felt when playing measure 12 because the notes in measure 10 are lower. Overall,

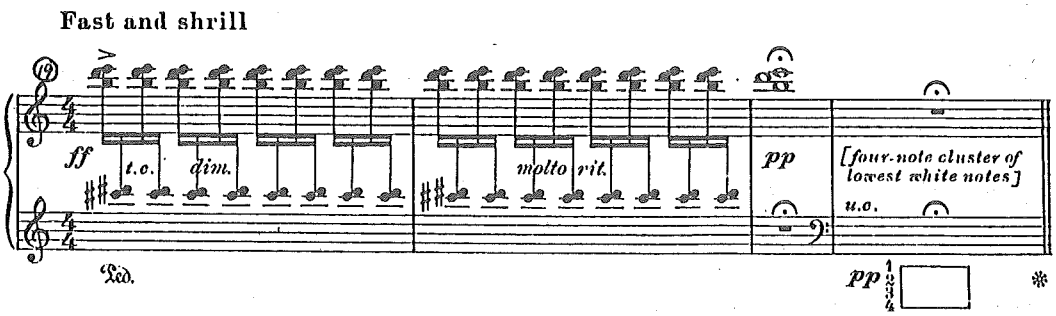
though, the "pulling" feelings in this piece will be very subtle in comparison to the following four examples presented.

2) Richard Faith, In the Meadow, meas. 1-6



With this piece, as the left hand crosses over the right hand, the sensations felt in the shoulder will be similar to those in the Beyer piece, but on the opposite side of the body. A subtle difference in the "pulling" feeling will be felt, however, as the left hand reaches for and plays the last note, d^3. This difference should be felt as a stronger degree of intensity when compared to the intensity in the Beyer piece.

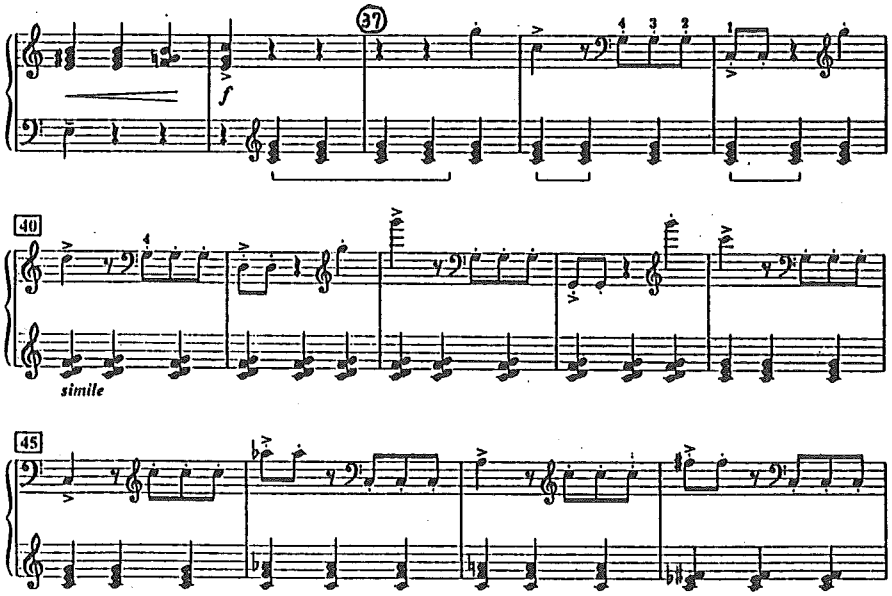
3) Seymour Bernstein, Vulture, meas. 19-22



To execute the chord clusters in measures 19 and 20 the left hand is pulled far across the body and overlapped with the right hand. This initial reach to the right by the left hand, combined with its

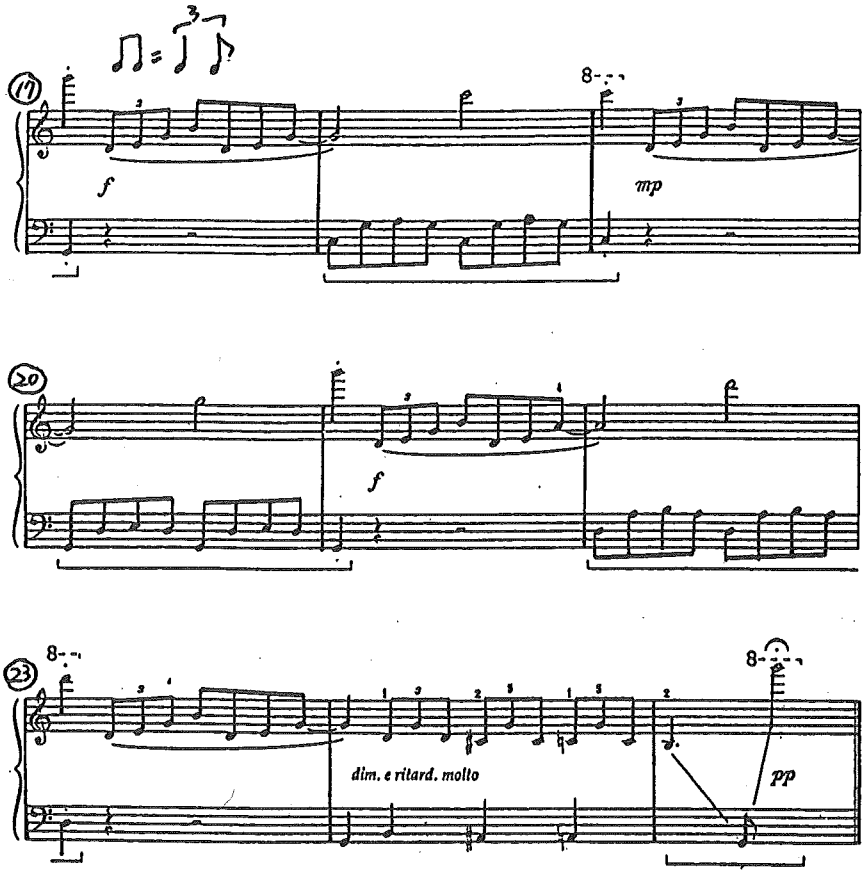
subsequent reach to the opposite end of the keyboard, creates a wide-ranging sweep of the arm. The student will not experience any particularly obvious "pulling" feelings as with "contraction", but should be able to create an awareness of the arm's movement as it shifts away from the contracted position and stretches to an expanded one.

4) Dmitri Kabalevsky, Who Will Win the Argument?, meas. 37-45



These 9 measures can be divided into two parts, each according to the action of the right hand. While the left hand stays in the c^1-g^1 range throughout the entire piece, the right hand crosses back and forth over the left hand numerous times. Within the first 5 measures this crossing-over stays within 1 octave on either side of the left hand, but in the remaining measures it increases in range to 2 octaves on both sides. Due to the increased range required of the right hand, students should be able to feel a distinct difference in shoulder intensity between the "contractions" and "expansions" of the two different parts. In addition, the player will also most likely feel an increase in intensity as a result of the "semi-jumping" action of the arms needed to help secure the required fingerings.

5) Jennifer Linn, Lightning Bug Boogie, meas. 17-25

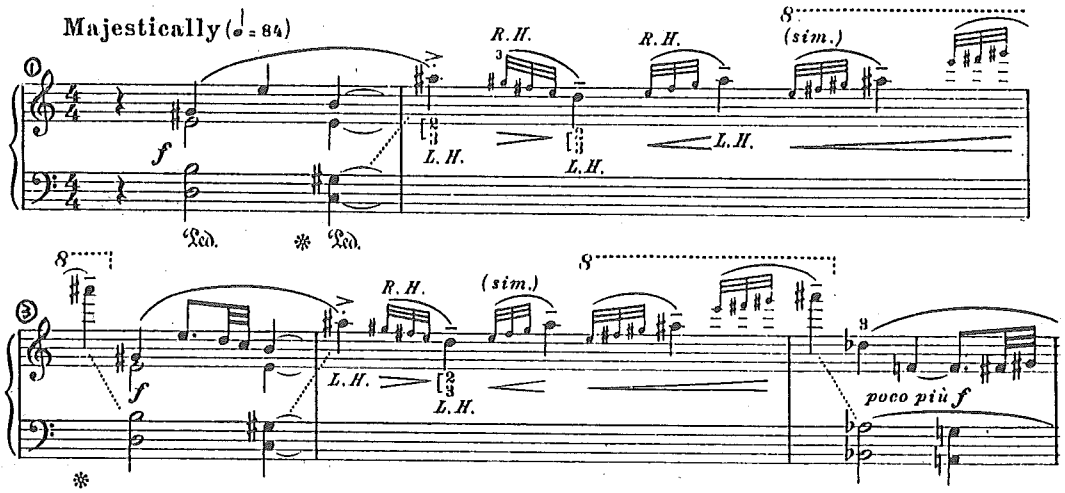


The movement of the right hand in this example is obvious. What the student should be aware of is that there are two distinct types of arm "expansions" at work as the right hand deals with notes ranging from the center (d^2) to either c^4, g^3, or d^4. When the right hand moves up the keyboard, it does so with a single, intermediate note before hitting either c^4, g^3, or d^4. However, when it moves down the keyboard to return to its "base" of d^2, it covers the full two and a half octaves in a single "jump". This combination of ranging motions in measures 17-23 compliments each other by enabling the student to first focus on the actual movement as the right hand moves up, then focus, as the right hand moves down, on how great an "expansion" has been created. When the final 3 measures are added, the awareness of range is intensified with the increased distance the right hand must move to reach g^4.

"Integrated" Movement

To this point in the discussion, motions have been isolated and identified as individual movements. It is important to remember that this was done solely for the ease and convenience of constructing a teaching approach. The movements needed for smooth, efficient piano playing are possible only through an integrated, interdependent body.

To reinforce this concept a single excerpt is now provided containing movements from each of the three areas discussed. The piece should be used only after a basic awareness has been developed through the use of the music in "Spine-Pelvis", "Pelvis-Buttocks", and "Shoulders". No commentary is provided, thereby providing students the opportunity for individual exploration.



Seymour Bernstein, The Eagle, meas. 1 to 5

CONCLUSION

A teaching approach has been presented which is hoped will provide teachers with a clearer way to help students bridge the gap between the concrete aspects of movement and the abstract qualities of movement awareness. In the process it has been shown how movement awareness can be used as a pedagogical tool to enhance the understanding of the production of music. The indirect involvement of

three, large playing units within the torso was identified through the application of movement awareness and simple music examples.

How extensive are the possible benefits gained from a solid background in movement awareness? This is a difficult question to answer because of the difficulty of measuring the abstract. We've already seen its benefit in understanding the use of the torso, but this is only the first step. It alone can not directly effect the expression of music, but rather is often the catalyst leading to improvements. Benefits are so interrelated that it can be impossible to determine how and why an actual improvement may have occurred. For example, will control and accuracy improve with our understanding of the torso? Does awareness help us learn to control nervousness and stage fright? Improvements tend to build upon each other with a cascading, accumulative effect. Expression is the ultimate goal, but awareness may help develop the proper movement needed for good expression.

Another question would pertain to the application of movement awareness to other areas of the body. Could piano pedagogy benefit by its use with the legs and lower body? What about the spine as a whole? How about the abdomen and breathing? Does awareness of head and neck movement have an effect on the eyes when reading scores? The possibilities are endless.

Students must be encouraged to take advantage of this awareness when playing. How do we as professional teachers do this? How strong a role should professional movement programs such as the Feldenkrais Method and the Alexander Technique play in helping to encourage students? Should movement awareness training be a part of music curriculums? There are many possibilities, but, most importantly, teachers must decide how best to adapt movement awareness to their individual style of teaching. The potential benefits to students are unlimited.

ENDNOTES

1. Denes Agay, ed., Teaching Piano, vol. 1 (NY: Yorktown Music Press, Inc., 1981), 12.

2. Marienne Uszler, Steward Gordon, and Elyse Mach, The Well-Tempered Keyboard Teacher (NY: Schirmer Books, 1991), 326, 329-333.

3. Uszler, Gordon, and Mach, The Well-Tempered Keyboard Teacher, 345-346.

4. Reginald R. Gerig, Famous Pianists & Their Techniques (NY: Robert B. Luce, Inc., 1974), 419-420; Uszler, 340.

5. For more detailed information of human anatomy, see, Gaudin, Anthony J. and Kenneth C. Jones, Human Anatomy and Physiology (San Diego: Harcourt Brace Jovanovich, Inc. Publishers), 143-154.

6. Barbara Conable, How to Learn the Alexander Technique (Columbus, OH: Andover Press, 1995), 52-53.

7. For an interesting discussion on leaning-forward body position angles as they relate to dynamics, see, Guy Wuellner, "Plumb Seating and Keyboard Angles", The Piano Quarterly 137 (Spring 1987): 55-58.

8. Caution must be used not to confuse the terms contraction and expansion with their more technical use with muscles. The reference here is intended solely as a description of an outward, physical action.

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探討如何藉由上軀体動作的動作知覺來改善鋼琴教學

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摘　　要

本研究之目的旨在探討如何利用藉助知覺來增強鋼琴教學的可能性。提供教師們運用譜例及彈奏時的具体動作，能將抽象的動作知覺概念轉變為實際效應再傳授給學生，因為動作知覺是鋼琴家優異彈奏的橋樑。

在簡要介紹鋼琴教學中上軀体動作的發展背景及相關的人体解剖結構後，本文透過重點式的探討，深入研究上軀体運動中，如何藉由音階、琶音及適當的譜例來配合肩胛、背脊及臀部等部位的運動動作知覺。因此所選譜例相當基本，期能適用於各種程度的學生。

在結論中，主要是討論動作知覺基本背景可能的優點，使學生可藉此獲得最好的改進。