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Valeria Albano

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The Development of Body Image in Dancers: Examining Gesture's Role in Conveying

Body Image

Valerie Albano

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Dr. Melissa Singer, Thesis Director
Dr. Michelle Mamberg, Committee Member
Dr. Elizabeth Spievak, Committee Member

Abstract

Body image and body dissatisfaction is an issue in western countries. Many females, especially dancers, have been objectified by a cultural stereotype of a thin body and being referred to as "skin and bones". Recently, body disturbances have been reported in children as young as six years old. Children this young may be unaware that they are expressing these negative thoughts about their bodies and thus, the measures assessing body image are challenging to analyze. Another line of research has shown that children spontaneously produce hand gestures when narrating stories, solving math problems, or explaining scientific ideas. Moreover, children convey ideas in their hand gestures before they can convey these ideas in the verbal modality. Gesture, along with the verbal modality, is a useful tool when assessing what a child knows or is thinking, especially when those ideas are new. We examined if young dancers display a negative body image and whether or not there are age related changes in body image when comparing the younger dancers to the older ones. In addition, we examined through gesture and speech, whether or not additional information about one's body image can be assessed and if these responses change across development. Using a cross sectional design, body image was measured in dancers using one of the following tests, the Body Assessment (BIA) (Williamson, et al, 1989), the Body Image Assessment for Preadolescents (BIA-P), or the Body Image Assessment for Children (BIA-C) (Veron-Guidry & Williamson, 1996). In addition, participant's gestures were examined through follow-up questions on the BIA measure. While there was not a statistical significance on the BIA across age groups, children displayed a more negative body image in comparison to the other age groups. Gesture was also found to convey substantial information about a dancer's body image. The findings suggest that it is important to

look at children's gestures, along with their speech, to determine a more accurate representation

about body image.

      Keywords: gesture, dance, dancers, body image, body dissatisfaction, drive for thinness

The Development of Body Image in Dancers: Examining Gesture's Role in Conveying

Body Image

Eating disorders have been shown to be quite common in western countries, especially in

females ranging from ages twelve to thirty (Pollatou, Bakali, Theodorakis, & Goudas, 2010).

Anorexia nervosa is diagnosed in about 9 of every 1,000 women and in about 3 of every 1,000

men. Bulimia nervosa affects 1% to 3% of women and 0.1% to 0.3% of men (Nevid, Rathus, &

Greene, 2011). Until recently, eating disorders were considered to be very rare in prepubertal

children; this resulted in an inaccurate assessment tool relevant to eating disorder symptoms in

preadolescents. Since studies in the past were not testing younger children properly for eating

disorders, many children were unable to receive the help they would have needed to potentially

stop the development of this disorder. While there are multiple factors which may cause an

eating disorder, body image disturbance and negative body image have been shown to have

effects on eating disorders (Veron-Guidry & Williamson, 1996). Negative body image can refer

to body dissatisfaction as well as excessive cognitive and behavioral investment in one's

physical appearance in defining one's self (Pollatou, Bakali, Theodorakis, & Goudas, 2010).

Body image disturbances are a part of the diagnostic criteria for anorexia nervosa and bulimia

nervosa (American Psychiatric Association, 2000). When looking at younger children, a

preference for thinness and body dissatisfaction has been shown in children as young as six years

old (Veron-Guidry & Williamson, 1996). In order to test body image at such a young age,

Veron-Guidry & Williamson created a reliable and valid measure of eating disorder symptoms

and body image disturbances among children.

The Children's Eating Attitudes Test (ChEAT) and the Body Image Assessment (BIA)

were the two models used in Veron-Guidry and Williamson's (1996) study in order to measure

these children's views on body image. The ChEAT is a 26-item, 6-point, self-report measure that assesses eating attitudes, dieting behaviors, and food preoccupation in young children. This test was modified from the original EAT test which was used for adults to assess anorexic attitudes towards eating disorders; ChEAT was modified from EAT by changing words deemed too difficult for children in third grade to understand. The BIA uses four sets of body image silhouettes which are mounted on separate 6 inch by 9 inch cards that correspond to male and female children and preadolescents. Each set of silhouettes has nine body sizes ranging from very thin to obese. Children were asked to point and pick out the body shape that looks most like themselves and then they were asked to pick a silhouette which they would most want to look like. This study (Veron-Guidry & Williamson, 1996) showed that children at very young ages do have clear preferences for a thin body size. The authors stated that these results were alarming because the majority of these participants were either normal or underweight, yet 40.5% of these children wanted to be thinner (Veron-Guidry & Williamson, 1996).

Preference for thinness has been shown to persist from childhood into pre-adolescence. Females who perceived themselves to be overweight prior to puberty scored significantly higher on measures of disordered eating, body dissatisfaction, drive for thinness, and perfectionism (Ackard, & Peterson, 2001). Participants also perceived their current body silhouette to be larger than those who believed they were average or underweight prior to puberty. While age at puberty onset was not significantly associated with disordered eating, body-dissatisfaction, or self-esteem, females who entered puberty at an earlier age scored higher on measures of asceticism, drive for thinness, and social insecurity. Those who experienced early puberty also chose a more slender ideal body silhouette than those who entered puberty at an older age. The authors concluded that females who believe they are overweight prior to puberty may be at a risk for the

development of disordered eating, body image dissatisfaction, and related problems due to this thought that has development prior to puberty (Ackard, & Peterson, 2001).

In another study, young girls who spent time on aesthetic activities, which are activities that have a strong emphasis on appearance of thinness, like ballet and gymnastics, was positively correlated with a drive for thinness (Slater & Tiggemann, 2011). The authors suggested that teasing from peers in aesthetic activities was also positively related to body image concerns in girls, which related to higher levels of self-objectification and body image concerns. Therefore, it is important to examine how body image develops, in particular when young girls are involved in activities that focus their attention on their bodies.

Body Image in Dancers

What might influence children at such a young age to have these negative perceptions about body image? While individuals differ in the extent to which they are focused on, and aware of, their bodies, there are similarities that do exist. When looking specifically at dancers, body awareness training is associated with greater levels of response coherence. Response coherence implies that emotions organize and synchronize different response systems such that when we are in the throes of a strong emotion, our subjective, behavioral, and physiological responses should track each other more closely than when we are at rest. Modern and ballet dancers, who have intermediate levels of coherence, received training that emphasized attending to somatic cues, such as muscle tone, alignment, and body position in space, rather than visceral activity (Sze, Gyurak, Yuan, & Levenson, 2010). Dancers have been subjected to the stereotype of being very small and thin; while stereotypes have been viewed as biased, exaggerated and negative, some research suggests that they may actually be fairly accurate. Many dancers at some point of their training, through their teachers, books, or film, have been shown the "starving

ballerina" image. This image was created by a famous choreographer and the New York City Ballet's founding artistic director, George Balanchine. Balanchine was known to go over to dancers and tap on their chests saying "Must see the bones" (Clabaugh, 2004).

Balanchine demanded that all of his dancers have a straight body and long limbs. Due to the threats and possibilities of losing a job if these body ideals were not kept, more and more dancers became aware of and focused on this particular body image. Soon, other dance companies began to follow the ideals of Balanchine, which placed more scrutiny on a dancer's shoulders, which created an even higher concern and willingness to strive towards certain characteristics of dance such as competitiveness, perfectionism, and compulsive concern about body shape (Pollatou, Bakali, Theodorakis, & Goudas, 2010). Ballet dancers have been shown to be more afraid of negative evaluation and ballet dancers need a strong sense of structure in their lives (Clabaugh, 2004). While a strive for thinness has been shown repeatedly in studies about dancers at the professional and pre-professional level, we cannot forget about the prevalence of these ideals among contemporary and nonprofessional dancers. This striving drive for thinness has been shown to occur in classes of all different levels of dance. However, dance instructor's explanations and personal views on weight related issues vary from one dance studio to the next. Some teachers may not mention it at all, whereas others will criticize dancers for being too big and even give dancers pointers on how to lose weight (Annus, 2009). While there is research examining body image in young adult dancers, to date very little research has examined the development of body image in young dancers. In addition, given this particularly vulnerable population, one of the goals of the current research project is to examine body image in young dancers.

The Role of Gesture in Children's Development

Younger children may not be able to articulate their body ideals and images. When dealing with body image issues, especially for those involved in dance, it may be hard for children to express their true feelings about their bodies; they may not even be aware that they possess these feelings nor have the language to express their ideas. In order to accurately characterize what children know, it is necessary to look beyond what they say; when children are asked to describe or explain a concept or story, their verbal reports may not capture all facets of their understandings on a particular topic. Nonverbal cues, such as facial expressions, eye contact, hand gestures, and body movements, may provide a more accurate assessment. In particular, children's gestures have been found to reveal unconscious aspects of thought and to depict concrete images such as actions or attributes of cartoon characters and abstract concepts, such as mathematical and scientific concepts (Gerofsky, 2010; Goldin-Meadow, 2000; McNeill, 1992; Singer, Radinsky, & Goldman, 2008). Most of the research has focused on one particular type of gesture, representational gesture. This type of gesture conveys iconic imagery to express information about people, objects, and events (McNeill, 1992). Researchers have also found that representational gestures bear close resemblance to the images that children describe in various domains in learning (McNeill, 1992; Goldin-Meadow, 2006). For example, a child may say in speech, "she climbed the staircase" while in the accompanying gesture, the child produces a spiral-like gesture. Here, the child is conveying the type of staircase in her gesture and is an example that illustrates how children's gestures provide more information than their speech alone. Research suggests that, children who produce additional information in their accompanying gesture (i.e., gesture-speech mismatch) when explaining various concepts in math and science are more likely to learn that particular concept when given training or instruction

(Goldin-Meadow, 2006). A gesture-speech mismatch is the type of gesture that is the focus of the current research project.

In addition to gesture's role in conveying particular concepts or strategies, gesture also appears to convey a speaker's particular viewpoint in relation to the content in speech, character viewpoint (CVPT) and observer viewpoint (OVPT) (McNeill, 1992). The character viewpoint correlates to a first-person verbal narrative point of view and the observer viewpoint correlates to a third-person narrative point of view. In McNeill's study, two viewpoints were determined when participants were retelling a story of an animated cartoon. When telling the story of an action filled scene, participants either gestured as if they were seeing from a distance and standing apart from the action, an observer viewpoint, or participants gestured as if they were the character of the story, who was taking a part of the action, a character viewpoint (McNeill, 1992).

Viewpoint has also been detected in gesture when learners describe mathematical concepts and has been shown to predict learning on those concepts (Gerofsky, 2010). In Gerofsky's study, participants were asked to explain a mathematical function using a graph produced in speech and gesture. Participants either drew the graph with an observer viewpoint, using their index finger as a pen writing on an imaginary piece of paper or with a character viewpoint, being in the graph and using the proximity of their bodies and space within their reach to describe the graph. Character viewpoint is generally associated with a deeply imaginative, personal involvement while the observer viewpoint is associated with a more detached and distant approach (Gerofsky, 2010). Based on viewpoint, researchers were able to predict the children who would learn the concept. For example, character viewpoint in gesture conveyed a child's closeness to the topic and was associated with a better or deeper

understanding on the topic. Based on gesture's role in conveying viewpoint, the research indicated that children may use gesture to convey their personal involvement with or distance to their ideas about their own bodies.

Viewpoint and Objectification Theory

Objectification in research shows that when women objectify the body, they use the observer viewpoint. This theory, first proposed by Frederickson and Roberts in 1997, discusses the consequences of being female in a society which sexually objectifies the female body. The thought process behind this theory is that the pervasiveness of sexual objectification in our society influences women and girls to internalize an observer's perspective of their physical selves, which means that they treat themselves as an object to be looked at and evaluated on the basis of appearance. Frederickson and Roberts coined the term as "self-objectification" to describe this perspective (Tiggemann & Slater, 2001).

Fredrickson and Roberts (1997) suggest that participation in a physical activity would actually stray away from the objectification perspective by focusing on what a body can do, as opposed to how the body looks, which should result in lower levels of self-objectification. Contrary to this theory, self-objectification tends to be higher in situations such as physical activities where a person is forced to accentuate his or her awareness of an observer's perspective of his or her own body. Body shame is also related in participation of aesthetic activities, activities that have a strong emphasis on appearance of thinness (ex. ballet, gymnastics, ice skating, etc.), which tend to objectify the female body (Tiggemann & Slater, 2001). According to objectification theory, it is expected that dancers might use an observer viewpoint when conveying ideas about their body image.

Current Study

Based on the research examining the role of gesture in children's development, we expect children to convey ideas about body image in gesture, particularly if they do not have the language or a complete understanding of body image. Moreover, while many researchers have focused on children's gestures in math and science, to date, there is no research on whether ideas about body image are conveyed in gesture. Thus, the purpose of this study is to bring together several areas of research; changes in body image across development in dancers as well as the role of gesture in conveying concepts of body image. Both areas of research are important in helping researchers, as well as clinicians, better assess body image in younger populations, in particular, vulnerable populations such as dancers.

In the current study, dancers ranging from ages nine to twenty-three were asked to select silhouettes based on questions about their current and ideal body image. The participants were asked follow-up questions based on their silhouette selections and their responses were video-recorded. A speech and gesture coding system was developed based on their responses to the follow-up questions on their silhouette selections. Body image was measured in dancers using a cross sectional design using one of three tests, the Body Image Assessment (BIA) (Williamson, et al, 1989), the Body Image Assessment for Preadolescents (BIA-P), or the Body Image Assessment for Children (BIA-C) (Veron-Guidry & Williamson, 1996). The BIA-P and BIA-C are modifications of the original BIA procedure. The BIA was selected as the measure for this research because it is a less intrusive measure of body image, particularly for children. The BIA does not ask children to comment on their own eating behaviors nor does the measure explicitly state or use negative body language. Follow-up questions were created based on the BIA silhouette selection of current and ideal body silhouettes in order to examine gesture.

While negative body image may be present in all ages, it was hypothesized that older

dancers would have higher BIA dysphoria scores compared to younger dancers. We also

expected that substantive information about body image will be conveyed in both speech and

gesture on the follow-up responses. Both the BIA dysphoria score as well as the information

conveyed in their speech and gestures on the follow-up questions will provide a more complete

assessment of one's body image.

Methods

Participants

A total of 22 female dancers, ranging from age nine to 23, participated in this study.

Dancers, ages nine to 17 were solicited to participate in the study from a private dance studio in a

suburban town; dancers, ages 18 to 23, were solicited to participate from the dance education

program at Bridgewater State University. Both the parents and children gave informed consent

and assent to participate in the study. Students at the university also gave informed consent to

participate in the study. Participants were not given any incentives for their participation in the

study. For the purpose of analysis, participants were grouped to one of three age groups, the

youngest, children group, ranged from ages nine to 10 ($M_C = 9.875$), the pre-adolescent group,

which ranged from ages 16 and 17 ($M_{PA} = 16.4$), or the adult group, which ranged from ages 19

to 23 ($M_A = 23$).

Materials

Participants were asked to participate in either the Body Assessment (BIA) (Williamson,

et al, 1989), the Body Image Assessment for Children (BIA-C) and the Body Image Assessment

for Preadolescents (BIA-P) from Veron-Guidry and Williamson's study, Development of a Body

Image Assessment Procedure for Children and Preadolescents (1996); the BIA-C and BIA-P are

modifications of the original BIA procedure developed. The procedure involved for sets of body

image silhouettes, mounted on separate 6 inch by 9-inch cards that correspond to female

children, preadolescents, and adults. Each set of silhouettes has nine body sizes ranging from

very thin to obese.

Administration of the BIA, BIA-C, and BIA-P involved the placement of the nine cards

with body image silhouettes in random order on a table or desk in front of the participant. The

participant was provided the following verbal instructions: "I want you to look at all of these

body shapes and point to the one that most looks like you do right now. You can pick only one

body shape." After the subject chose a silhouette, the silhouette number, which is written on the

back of the card, was recorded. The participant was then provided with the following

instructions: "I want you to look at all of these body shapes and point to the one that you would

most want to look like if you could look like any of these. You can only pick one body shape".

After a silhouette was selected, the silhouette number was recorded. The entire procedure

generally took about one minute. These data yielded scores for CBS and IBS for each

participant. A body dysphoria score was derived from the difference between CBS and IBS

(CBS-IBS), a higher dysphoria score indicates a more negative body image (Veron-Guidry &

Williamson, 1996).

Procedure

After obtaining consent from each participant, the procedure was a one-on-one interview

session with an experimenter. Each participant was administered a body image assessment (BIA-

C or BIA-P: Development of a Body Image Assessment Procedure for Children and

Preadolescents, Veron-Guidry & Williamson, 1996). Specifically, participants were asked to

select a silhouette in response to the question on the their current self, "I want you to look at all

of these body shapes and point to the one that most looks like you do right now" and then once

again in response to a second question on their ideal self, "I want you to look at all of these body

shapes and point to the one that you would most want to look like if you could look like any of

these. You can pick only one body shape".

Participants from all age groups were then asked three open-ended, follow-up question, to

explain why they selected each silhouette. Specifically, the experimenter placed their first

selected silhouette in front of the participant and asked them: "When I asked you to point to the

one picture that most looks like you do right now, you had chosen this picture. Tell me how you

chose that one?" Next, the experimenter placed their second selected silhouette in front of the

participant and asked them: "When I asked you to point to the picture that you would most want

to look like if you could look like any of these, you had chosen this picture. Tell me how you

chose that one?" The experimenter then placed both silhouettes (their first and second selections)

side by side in front of the participant and asked them one of the following prompts depending

on whether the participants selected the same or different pictures. If the participant selected

different pictures: "I noticed you chose two different pictures, explain to me why you chose two

different pictures?" If participant did not respond or did not know, the experimenter used the

prompt: "Is there something about the pictures that helped you in making your selections?" If the

participant does not mention any differences between their selections then the experimenter used

the prompt: "Do you notice any differences between the two pictures? If so, what are those

differences?". If the participant selected the same pictures: "I noticed you selected the same

pictures, explain to me why you chose the same pictures?". If participant did not respond or did

not know, the experimenter used the prompt: "Is there something about the pictures that helped

you in making your selections?".

The whole session took approximately 15-25 minutes. The silhouette selections for the current and ideal selves were recorded and the follow-up questions were videotaped so that we could assess each participant's verbal and gestural responses to the follow-up responses. At the end of the interview, participants were debriefed about the study and asked if they had any questions or concerns regarding the study or procedure. Lastly, participants were thanked for their participation.

Data Preparation and Coding

Dysphoria score. A body dysphoria score was calculated based on the difference between the participants' selection on their current body silhouette and their ideal body silhouette selection for each age group. The body silhouette selections ranged on a numeric scale from one to nine, one being anorexic and nine being obese. After selecting a current body silhouette, participants were then asked to select an ideal body silhouette which could either be bigger, smaller, or the same size as their current body silhouette selection. After the participants had selected both a current and ideal body silhouette, the body dysphoria score was calculated by subtracting the ideal body silhouette number from the current body silhouette number, a higher dysphoria score indicates a more negative body image. A zero body dysphoria score would indicate that the participant selected the same picture for the current and ideal body silhouette selections.

Coding speech. All of the participant's verbal responses were first transcribed to the follow-up questions. Each participant made three responses. Then all responses according to what each participant referenced in speech were coded. All responses could be coded according to two categories, reference to a particular part of the body (i.e., chest/breasts, waist, legs, torso, buttock, hips, calves, and stomach), and reference to the overall all body size and shape (i.e., big,

small, thin, curvy, hourglass, fat, obese, heavy, lean, etc.). See Table 1 for an example of how

speech responses were coded. In addition to content of the speech, viewpoint was coded as either

character viewpoint (CVPT) or observer viewpoint (OVPT). Viewpoint was coded as to whether

the participant referenced the content with the CVPT (e.g., "Um, I feel like I kinda wanna stay

the same but I kinda want to get like the tiniest skinny"), an OVPT (e.g., "It seems like they have

a flatter stomach"), or responses could be coded as containing both viewpoints in a single

response. For example of a how viewpoint was coded, refer to Table 1.

Coding gesture. Next, hand gestures produced by each participant for all three responses

were transcribed. Overall, all participants produced gesture on at least two of the three questions.

Based on both McNeill's (1992) and Gerofsky's (2010) system for coding gesture content and

viewpoint, we developed our own coding system for coding references to parts of the body and

body size/shape, as well as, viewpoint. The coding was based on the participant's hand shape,

motion of the hands, trajectory of the gesture, orientation of the hands to the body, and distance

between the gesture and their own bodies. The next step was to code for the content conveyed in

gesture for each response. In order to do this, we first made note of the hand shapes and motions

that were produced the most often by all participants. Then, we compared these common

gestures to the particular content that was conveyed in speech. This way we were able to get an

idea of what the gestures were conveying, that is, all of the gestures could be mapped onto the

content conveyed in speech. For example, when both hands were flat and parallel with palms

facing each other, in front of the participant's waist, this gesture most often occurred when the

participant referenced the waist or torso in speech. This gesture was coded as referencing a

particular part of the body. On the other hand, when both hands are at a further distance at

shoulder height of the participant with palms facing each other, making an hourglass shape, this

is an example of a gesture that was coded as referencing the overall body size and shape, curvy.

Please see Table 1 for sample coding of gesture.

For coding viewpoint, the first step was to identify whether the participant's gestures

used a CVPT or OVPT or both. When coding for the CVPT, participants produced gestures that

either touched their own body, their palms were faced inward towards their body, or their hands

were at eye level. When coding for the OVPT, participants produced gestures where their hands

or palms were facing outward (away from their body) or when the palms were facing one

another, or the hands and the subsequent motion and trajectory was in front of their torsos at

some distance (refer to Table 1).

Coding the relationship between speech and gesture. The last step in our transcription

process was to determine the relationship between what the participant conveyed in speech and

what the participant conveyed in gesture for both content and viewpoint for each of the three

responses. In order to do this, we compared our participants' viewpoints conveyed in speech and

gesture on each response to see whether viewpoints matched (e.g., the participant conveyed both

CVPT in speech and in their accompanying gestures), mismatched (e.g., the participant conveyed

CVPT in speech and conveyed OVPT in their accompanying gestures), or each viewpoint was

conveyed in speech alone (without accompanying gestures) or in gesture alone (without

accompanying speech) (refer to Table 1 for sample coding). The same analysis was done for

content conveyed in speech and gesture on each response.

After we coded the responses to the three follow-up questions on how they made their

BIA silhouette selections in speech and gesture (i.e., how they made their current selection, ideal

selection, and then asking about the differences between their current and ideal silhouette

selections), we then calculated a proportion of the total number of references each participant

conveyed body content in speech and in gesture. We also calculated the proportion of the total

number of participants in each age group who used each viewpoint (CVPT, OVPT, or both

together in one response) for all three responses. Finally, we calculated the proportion of times a

reference to body content and viewpoint was conveyed in a Match, Mismatch, Speech Alone, or

Gesture Alone for all three responses for each age group.

Results

Does Body Dysphoria Differ Across Age Groups?

We hypothesized that there would be a difference in body dysphoria between age groups

in dancers. A one-way ANOVA was used to compare the mean body dysphoria scores between

age groups. For the children group, the mean body dysphoria score was 1.38 ($SD = .916$). For the

pre-adolescent group, the mean body dysphoria score was -0.20 ($SD = 2.17$). For the adult group,

the mean body dysphoria score was 0.78 ($SD = 1.92$). The differences among the means were not

statistically significant [F (2,19) = 1.34, p = 0.29]. It is important to note that the youngest

dancers reported the biggest dysphoria score, indicating a more negative body image, compared

to the older dancers, even though this difference was not statistically significant.

Is There a Relationship Between Silhouette Selection and Age?

The BIA dysphoria score did not indicate whether each participant's selection was

bigger, smaller, or the same, so the type of silhouette selection was examined in relation to the

age of the dancer. In order to determine if there was a relationship between age and the type of

silhouette selected, a Chi-square Test for Independence was calculated. Children were more

likely to select a smaller silhouette compared to other selections of either a bigger or a same

silhouette, while adults and pre-adolescents were just as likely to select a bigger, smaller or the

same silhouette as shown in Table 2. However, the relationship between age and silhouette

selection was not statistically significant (χ^2 (4) = 7.02, p = 0.14). Thus, age and silhouette

selection were independent of each other.

Responses to the Follow-up Questions in Speech and Gesture

        Proportion of references to body content and viewpoint in speech. Table 3 shows for

each age group, the proportion of references to a particular part of the body and overall body size

and shape in speech. In this table, children had a much higher proportion of overall references to

body size in their responses (0.80) compared to the overall proportion of references to a

particular part of the body (0.20). On the other hand, pre-adolescents did not show a big

difference in the proportion of references to overall body size (0.55) and parts of the body (0.45)

in their speech. Adults, like children, also had a tendency to convey overall body size (0.66) in

their speech compared to a particular part of the body (0.34).

        Table 4 shows the proportion of participants in each age group who conveyed a particular

viewpoint in speech, OVPT, CVPT or both OVPT and CVPT. One again, there were differences

in viewpoint between the children and adults. When looking at the children, the majority of the

participants in this age group used a CVPT (0.52). More children also incorporated both

viewpoints (0.30) over OVPT alone (0.17). The pre-adolescents did not utilize one particular

viewpoint more than the other; CVPT used by most pre-adolescents (0.46), followed by OVPT

(0.38), and both viewpoints together (0.15) even less. On the other hand, more of the adults used

the OVPT viewpoint (0.48) compared to CVPT (0.30) or both viewpoints (0.22) in speech.

        Proportion of references to body content and viewpoint in gesture. Table 5 shows the

proportion of total references to body content (reference to overall body size and reference to a

particular part of the body) for each age group conveyed in gesture. The children and pre-

adolescents did not always convey the same content in speech as they conveyed in gesture. The

children's speech conveyed a higher proportion of references to overall body size and shape in

speech (refer to Table 3), however, their gestures had a similar proportion of references to a

particular part of the body (0.55) and overall body size and shape (0.45) The pre-adolescents

only conveyed overall body size in gesture (1.00) and did not reference any particular parts of

the body (0.00), which was quite different from their speech were they did not utilize one type of

content more than the other. Adults had a higher proportion of references to overall body size in

gesture (0.72) than references to specific parts of the body (0.28). This was consistent with what

they were conveying in speech.

Table 6 shows the proportion of total references to viewpoint, OVPT, CVPT, or both for

each age group used in gesture. When looking at the participants viewpoints in gesture, children,

used different viewpoints in their speech and in their gesture. In the children's speech, most

children used the character viewpoint the most (see Table 4) whereas in the gesture most

children used the OVPT (0.43) or both viewpoints together (0.43) instead of the character

viewpoint (0.14). While the pre-adolescents did not use one viewpoint more than the other in

their speech, in gesture, all of the pre-adolescents used the OVPT (1.00) and they did not use

CVPT at all (0.00) or both viewpoints together (0.00) in their gesture. Differences can be seen in

the pre-adolescents and children in their use of viewpoint. On the other hand, the adults

continued to follow the trend that we had noted in their speech: most adults, in gesture, used

OVPT (0.61), then CVPT (0.30), and rarely used both viewpoints together in a single response

(0.09).

Relationship between speech and gesture for references to body content and

viewpoint. For each age group, the total number of times participants referred to body content

was calculated (both referring to a particular part of the body and overall body size/shape) in

speech alone (without accompanying gesture), in speech with the same content conveyed in the

accompanying gestures (matching speech and gesture), in speech with different content conveyed in the accompanying gestures (mismatching speech and gesture), or gesture alone (without accompanying speech). Table 7 shows for each age group, the proportion of total references to body content for each modality. Children, were more likely to use speech alone (0.55) to convey body content compared to matching speech and gesture (0.20) and mismatching speech and gesture (0.10), or gesture alone (.15). Pre-adolescents were just as likely to convey body content in matching speech and gesture (0.31) and speech alone (0.38) in their responses compared to mismatches (0.19) and gesture alone (0.13). Adults had the largest proportion of matches when conveying body content (0.52) compared to the other modalities, mismatch (0.14), speech alone (0.28), and gesture alone (0.07).

Table 8 shows for each age group the proportion of total viewpoints conveyed in each modality. Children used speech alone (0.70) most often to convey viewpoint, followed by matching speech and gesture (0.20), and mismatching speech and gesture (0.09) less often to convey viewpoint compared to both older dance groups. Pre-adolescents produced mismatching speech and gesture most often (0.46) however, pre-adolescents also produced speech alone to convey viewpoint in their responses (0.38). Pre-adolescents produced matching speech and gesture less often (0.15) compared to adults when conveying viewpoint. When looking at the adults in how they conveyed viewpoint, adults produced mismatches most often (0.52) followed by matching speech and gesture (0.30) and, then speech alone (0.19).

Discussion

It was hypothesized that older dancers would show a more negative body image compared to younger dancers. We tested this hypothesis using the BIA dysphoria score and found there was not a statistically significant difference between age and dysphoria scores,

however there was a trend that younger dancers showed the more negative body image compared to the older dancers. We also expected that substantive information about one's own body image would be conveyed in gesture. To examine this, follow-up questions to the BIA selections were created and looked specifically at the gesture from the participants' responses. Overall, participants conveyed substantive information on how they made their selections, based on overall body size and shape and based on a particular part of the body. In addition, participants used a particular viewpoint when conveying this information in both speech and gesture. Interestingly, the information conveyed in gesture for both body content and viewpoint, was at times, different from the information that was conveyed in both the younger and older dancers accompanying speech, creating a mismatch. This finding illustrates how researchers need to consider both gesture and the accompanying speech when both adults and children convey ideas on their own body image to capture all facets of one's understanding of their body image. We will comment in more detail on each finding below.

Development of Body Image in Dancers

Even though there was no statistically significant difference across age groups on the BIA measure on body image, it is still worth noting that children did show a trend towards a more negative body image compared to the older dancers, and all but one child picked the smaller silhouette, compared to their current body silhouette, when asked to pick a silhouette that was their ideal body. The finding replicates research indicating that a negative body image develops in young children as young as six years old as well as dancers may be particularly vulnerable to developing a negative body image (Annus, 2009; Pollatou, Bakali, Theodorakis, & Goudas, 2010). To date, there is very little research on the development of body image in young dancers and most of the research tends to focus on older and more experienced dancers. Based

on the current findings, future research is needed to further examine whether young dancers develop a body image that is more negative than the general population of young girls. Historical factors may also play a persuasive role in this younger population's ideals due to the increasingly larger role social media as in society today.

There are alternative explanations to our finding that the younger dancers showed a bigger body dysphoria score on the BIA. The first explanation is that the results could be due to the demand characteristics of the testing situation. It is possible that, compared to children, the adults were more aware of what having a negative body image means in our society and therefore did not reveal a negative body image to the experimenter. Another explanation is that the findings are an artifact of the wide range of previous dance experience and training. The children in our study came from the same dance studio, so they were all learning dance from the same teachers and in the same setting. The adult age group was derived from a college sample of participants who had danced at different studios and with different teachers throughout their lives. Some dancers may have experienced much more negative body awareness in their own classes in comparison to other participants. More research is needed so that controls for this range and variety of dance experience in the study sample.

Another limitation relating to the participants is that we did not have enough power with our small sample size. Thus, in the future we will need to include a larger sample size to confirm this particular trend on the BIA measure. In addition, future research could compare the development of body image in both dancers and non-dancers to see if in fact, dancers had a more negative body image in comparison to non-dancers.

Objectification and Observer Viewpoint

Both younger and older dancers used the observer viewpoint when responding to questions about their silhouette selections. When looking at speech on the follow-up responses, a higher proportion of younger dancers used CVPT compared to OVPT. For pre-adolescents, about the same proportion of pre-adolescents used both OVPT and CVPT. For the adults, a higher proportion of the older dancers used observer viewpoint than character viewpoint compared to the younger dancers. However, when we examined gesture, the picture slightly changes. A higher proportion of the younger dancers used OVPT in gesture compared to CVPT, a higher proportion of pre-adolescents used OVPT, and there was an increase in the proportion of adults who used OVPT. Looking at both speech and the accompanying gestures in the follow-up responses, our findings suggest that even in young dancers, there is some evidence of self-objectification in ballet dancers and hence, a negative body image. These findings correspond to research showing that when women and girls objectify their bodies, they use the observer viewpoint (Frederickson & Roberts, 1997), especially in situations where there is a strong emphasis on appearance of thinness, like ballet (Slater & Tiggemann, 2001).

Conveying Body Image in Gesture

To date, there is no research on whether people use gesture to convey ideas or concepts of body image. Based on the analyses of follow-up responses, it appears that people do in fact convey substantial information about body image in gesture. Specifically, dancers conveyed information on how they made their silhouette selections when asked about their current body and ideal body. Their gestures, along with their accompanying speech, conveyed that their selections were based on a particular part of the body (e.g., referring to the stomach, breasts, or

thighs of the silhouette or of themselves) as well as the overall body shape and size (e.g., fitter body, curvy body, bigger shape).

Age related differences were also found in what the dancers conveyed in speech and gesture. Children conveyed a higher proportion of references to a particular part of the body. Conversely, pre-adolescents only referred to overall body size and shape in gesture and did not refer to a particular body part at all in gesture. Adults, like the pre-adolescents, conveyed a higher proportion of references to overall body size and shape in gesture.

When examining speech, we see a slightly different picture where the children produced a higher proportion of references to overall body size and shape in comparison to a particular part of the body. Pre-adolescents, on the other hand, had a similar proportion of references to overall body size and shape as well as to a particular part of the body. Interestingly, children referred mostly to their own body or the picture's overall body size more than the adults and pre-adolescents.

Similar to previous research on gesture's role in conveying viewpoint in narrative and math contexts, we found that viewpoint was also used in the context of body image and gesture revealed more information about viewpoint than speech alone. For example, most of the children used CVPT in speech but when we examined their accompanying gestures, most of the children used OVPT or both viewpoints together in one response to the follow-up questions on silhouette selection.

When looking at the relationship between speech and the accompanying gesture, we found that all dancers produced gesture-speech mismatches when conveying both body content and viewpoint. For example, a child in response to why she selected a particular silhouette for her ideal body said, "I just looked at that one and that like just looked like me, like the skinniest,

but not the skinniest one ", while her hands come up to her stomach, she holds her stomach with interlocking fingers. In speech, this girl referred to overall body size and shape (skinny) but in her accompanying gestures, she referred to a particular part of the body (stomach). Here, her gesture provides more information than her speech alone. Based on previous research, mismatches are generally produced when a learner is in transition with respect to learning a particular concept in math and science (Goldin-Meadow, 2006). That is, learners who mismatch on a particular problem are more likely to benefit from training on that problem compared to learners who do not produce mismatches. This is the first study (Goldin-Meadowd, 2006) that has examined the production of mismatches with respect to a completely different concept, body image. In our study, when the dancers produced mismatches, it could indicate that the dancer is in transition with respect to developing her body image. Future research should investigate whether mismatches produced in this context can index a transitional state with respect to body image. In addition, future research would need to establish the reliability of our gesture coding system.

To date, no research has examined whether gestures convey substantive information about one's own body image. Findings in the current study suggest that, in fact, they may. In addition, gestures revealed more information on a dancer's viewpoint than her speech alone. The findings suggest that gesture may reveal more about a person's body image than just speech alone. Moreover, there is very little research on body image in young dancers. Taken together these findings suggest that more research is needed in order to further examine and elucidate gesture's role in conveying body image as well as how body image develops in young dancers. This research in turn, may provide researchers and clinicians with an additional assessment tool to help identify issues regarding one's body image.

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Table 1

Examples of Reference to Body Content and Viewpoint Produced in Speech and Gesture

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Sample Question 1: "When I asked you to point to the one picture that most looks like you do right now, you had chosen this picture. Tell me how you chose that one?"

Speech Coding: Body Size/Shape, OVPT

Speech: "um, because it is not the skinniest but it's not the biggest one, I don't know it's one of the more cuvyish pictures"

Gesture Coding: Body Size/Shape, OVPT

Gesture: Both hands raised to table level then come together to form a ball-shape, then rotate outward towards ceiling, both hands drop to lap

Coding Relationship between
Speech and Gesture: Match for Body Content, Match for Viewpoint

Sample Question 2: "When I asked you to point to the one picture that most looks like you do right now, you had chosen this picture. Tell me how you chose that one?"

Speech Coding: Body Size/Shape, OVPT

Speech: "mhm, umm well she has a similar body type like me even though she is much taller… but I feel like that one is the best suited for me"

Gesture Coding: Body Size/Shape, CVPT

Right hand comes up to head level, palm facing inward with fingertips parallel to the table, pause, hand drops to lap

Coding Relationship between
Speech and Gesture: Match for Body Content, Mismatch for Viewpoint

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Note: This table shows sample responses from our participants based on their follow-up questions in order to show how we coded the responses, specifically how we coded for body size/shape, viewpoint, and the relationship between speech and gesture.

Table 2

Silhouette Selection for Each Age Group

Age	Smaller	Bigger	Same	Total
Adults	5	1	3	9
Pre-Adolescents	1	2	2	5
Children	7	1	0	8
Total	13	4	5	22

Note: This table shows that children were more likely to select a smaller silhouette compared to a bigger or same silhouette while adults and pre-adolescents were just as likely to select a bigger, smaller, or same silhouette, although this relationship was not statistically significant.

Table 3

Proportion of Overall References to Body Content for Each Age Group Produced in Speech

Age	Reference to Overall Body Size/Shape	Reference a Part of the Body
Adults	0.66	0.34
Pre-Adolescents	0.55	0.45
Children	0.80	0.20

Table 4

Proportion of Participants in their use of Viewpoint in Speech

Age	Viewpoint		
	OVPT	CVPT	Both
Adults	0.48	0.30	0.22
Pre-Adolescents	0.38	0.46	0.15
Children	0.17	0.52	0.30

Table 5

Proportion of Overall References to Body Content for Each Age Group Produced in Gesture

Age	Reference to Overall Body Size/Shape	Reference to Part of Body
Adults	0.72	0.28
Pre-Adolescents	1.00	0.00
Children	0.45	0.55

Table 6

Proportion of Participants in their use of Viewpoint in Gesture

Age	Viewpoint		
	OVPT	CVPT	Both
Adults	0.61	0.30	0.09
Pre-Adolescents	1.00	0.00	0.00
Children	0.43	0.14	0.43

Table 7

The Proportion of Overall Body Content Produced in Speech Alone, Matching Speech and Gesture, Mismatching Speech and Gesture

Age	SA	Match	MM	GA
Adults	0.28	0.52	0.14	0.07
Pre-Adolescents	0.38	0.31	0.19	0.13
Children	0.55	0.2	0.1	0.15

Table 8

The Proportion of Overall Viewpoint Produced in Speech Alone, Matching Speech and Gesture, Mismatching Speech and Gesture

Age	SA	Match	MM
Adults	0.19	0.3	0.52
Pre-Adolescents	0.38	0.15	0.46
Children	0.7	0.09	0.22

Note: Participants did not produce viewpoint in Gesture Alone.