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Children's Self-Image Represented Through Drawn Portrayals

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Abstract

The concept of body perception spans across various cognitive processes, all of which are integral to understanding the way we fit into our world. For children, this is a skill that must rapidly develop alongside their similarly rapid physical growth (Neves et al., 2017; Truby & Paxon, 2002). Creativity - a means of expression for people across the spectrum of age - is also important to a child's view of the world and their expression of such view, as complex (and especially abstract) language might not yet be mastered (Farokhi & Hashemi, 2011). Through the analysis of children's self-portraits and measured body distortion, this study seeks to investigate how preschool children's perception of their body size is represented through their self-portraits. This research goal is achieved by comparing the quantified level of detail in participants' (4- to 5-year-old children; from preschools in rural New Hampshire) self-portraits to a measured ratio of body image distortion. An overall significant negative correlation was shown between the level of drawing detail and body image distortion (r = -.498, p = .007). This relationship between measures has the potential to create a method of monitoring children's internal mental state as it relates to body image in an easy and unintrusive way.

Keywords: *body image distortion (BID), drawing detail, self-portraits*

Parents are always looking for the best way of keeping their children safe. The scientific community frequently acknowledges the vital importance of the role a child's body perception plays in this endeavor for safety. In fact, one of the main three diagnostic criteria for anorexia nervosa, which is widely known as the deadliest mental disorder, is a "disturbance in the way in which one's body weight or shape is experienced" (American Psychiatric Association, 2013, p. 339; Chesney et al., 2014). Additionally, multiple prior studies have demonstrated the ways that children's inner mental state can be represented through their drawings (Glewwe et al., 2017; Zvereva et al., 2023). When looking at these facts together, one can see why looking at how a child draws themselves could serve as a representation of their inner body perception. Despite this, studies linking the two concepts are few and far between.

In a review of the current literature, there seemed to exist only two investigations with similar research questions to those of the present study, both with their own limitations. The first, by Lampe et al. (2016), focuses on using the drawings of children with Cerebral Palsy as diagnostic tools for identifying Body Representation Disorder (BRD), a common effect of the disease. To detect the presence of BRD, the researchers tested for body part pointing and calling, spatial concepts (such as inside, outside, under, on the top, etc.), left-right orientation, and implementation of everyday action (Lampe et al., 2016). The occurrence of the disorder was then compared to the results from Hermann Ziler's Draw-a-Person-Test (Lampe et al., 2016). Though the idea of correlating body perception with drawing may be within the same area of research as the present study, the focus population made the methods inapplicable. The test for BRD was the primary issue, as it tested for dysfunction that likely would not be present in a typically-developing preschool population.

Another paper with a similar focus question was Crogman (2018): research consisting of children completing a figure scale test and drawing their perceived and ideal self. This data, along with measured BMI metrics, was then analyzed in order to establish possible relationships between weight status and real-ideal distortion (Crogman, 2018). While weight was not a significant predictor of this distortion, children were said to represent themselves "radically differently" in drawings and further study into this difference was called for (Crogman, 2018). However, in this attempt to do so, many aspects of their methods must be altered to fit the new, altered research question. While the focus of Crogman's (2018) paper was on body image distortion, nearly the entire paper was dedicated to body satisfaction as opposed to perception. Mere sentences were reserved to addressing body perception, with the main conclusion being that the children were expected to be good at depicting themselves because they performed well in the figure scale test (Crogman, 2018). Because of this lack of attention to the main focus of the current research question, using this procedure would require the addition of perception evaluation.

This critical review of existing literature furthers work in this subject in two main ways. Because there are seemingly no existing studies focusing on the exact same research question and population as is currently being investigated, prior research must first be used to establish what has not been done and what can be improved upon. These gaps are where new findings can fit in as well as stand out. From there, the procedures used in similar investigations can inform how to proceed with data collection.

The Current Study

Applying these experiences and findings of prior studies to a unique focus population and question creates a new study aimed at connecting the concrete to the abstract. In particular, this study poses the question: How can the way preschool children perceive the size of their own bodies be represented through the way they draw their self-portrait? The methods presented here seek to prove that a low level of detail in a child's tangible, and easily attainable, drawings reveals a hidden inaccurate mental understanding of body size. Evidence to support this hypothesis would create a new opportunity for parents, teachers, and other caregivers to gain perspective on any potentially concerning mental states in their children and opens the door for these important conversations at an earlier age than previously possible.

Methods

Sample

Twenty-six pre-school children (female = 9, male = 17; age M = 56 months, range = 48-63 months) participated in this experiment. Two children, 62-month-old and 53-month-old females, were excluded from the final sample because they were unwilling to participate. Participants were recruited on a voluntary basis through the pre-schools that they attend in rural New Hampshire. These pre-schools were chosen due to convenience. Consent was given by the parents after reading and signing the informed consent document. Additionally, demographic information, including each subject's age and gender, was collected. Protocol and consent forms were approved by the ethics review board of Colby-Sawyer College. Participants received no monetary or other compensation for participating in the study.

Study Procedure

In order to limit distraction and input from other students, participants were first taken to a separate area of the classroom, within view of their pre-school teacher. Participants were then given a brief overview of what to expect and gave their verbal assent to continue. This overview included the procedure they were to follow, the confidentiality assurances, and their option to withdraw at any point.

Following assent, a modified version of the methods used by Speranza and Ramenzoni (2022) was performed. The children were provided with a pile of blocks, all of a uniform size. They were then asked to provide an estimation of their own body size using the blocks as a unit of measurement. This was asked of them using the oral instructions: "How long is your [body part] in blocks?" After each instruction, the researcher pointed to their body to show the part being referenced. The body parts being estimated included: arm, leg, torso, and full body height. A measurement of each body part previously listed was then taken and documented in inches. This provided an actual length to combine with their provided estimate in order to create a body distortion ratio.

Finally, the participants were asked to draw themselves on a standard sheet of 8.5"x11" paper. They were asked to do so with the words "Can you draw a picture of your whole body on this piece of paper?" These images were then assigned a number to maintain anonymity while tracking which drawings are connected to which results of the first research section (body distortion measurement).

Data Analysis Procedure

The first step of analyzing the collected data was calculating the level of body distortion for each child and each body part. This was done by dividing the estimated length, as measured in blocks, by the actual length for each body part of focus (arm, leg, torso, and full height). An average body image distortion for the child as a whole was also calculated. These calculations can be represented through the following equations:

$$Body\ Part\ Distortion = \left(\frac{Estimated\ Length}{Actual\ Length}\right) - 1 \quad (1)$$

$$Total\ Distortion = \left|\frac{(Arm\ Distortion + Leg\ Distortion + Torso\ Distortion + Height\ Distortion)}{4}\right| \quad (2)$$

The children's drawings were then quantified using an edited version of the Goodenough (1926) Draw a Man Test (refer to Appendix). In its current state, the test asks children to "draw a man," and then quantifies their illustrations based on their inclusion of certain details (Goodenough, 1926). This score is then said to predict the child's level of intelligence (Goodenough, 1926). As is usually the case with outdated studies, a more recent appraisal of this test has found the claimed links between its scores and intelligence, as defined by the Ages and Stages Questionnaire, to be insignificant (Baraheni et al., 2018).

However, Goodenough's (1926) research is still capable of contributing to this measure. Its potential for signifying intelligence has been proven unreliable, but simply changing its intended evaluative purpose eliminates this issue. Rather than attempting to use it to test intelligence in the study sample, it is instead connected with the separate measure of body perception. Included in the original test's list of criteria for scoring are many indicators of a child's awareness of the body. Additionally, there is data within the original study suggesting which items might be achieved at certain ages, from four to ten years old (Goodenough, 1926, p. 24-25). Within this information is listed what preschool children are most likely to be capable of. These are the scoring details that were retained in the adapted rubric

in order to prevent overly high expectations of what parts a young child should be including within their self-portraits (Goodenough, 1926).

As referenced in the Appendix, the adaptation has a total of 24 details across six categories. Each drawing received a score of either 0 or 1 for each of the 24 details listed, with 0 denoting a lack of the detail and 1 denoting its presence. To establish interrater reliability, measurements of each participant's drawing score were repeated three times by different raters. The intraclass correlation coefficient was found to be "excellent," ICC = .952, after analysis using a single measures (k = 3), absolute-agreement, two-way mixed-effects model with 95% confidence interval, 0.91-0.98.

After coding, each child finally received both a total detail score and a score for each body part. These quantities were then compared against the body image distortion scales and tested for correlation and significance.

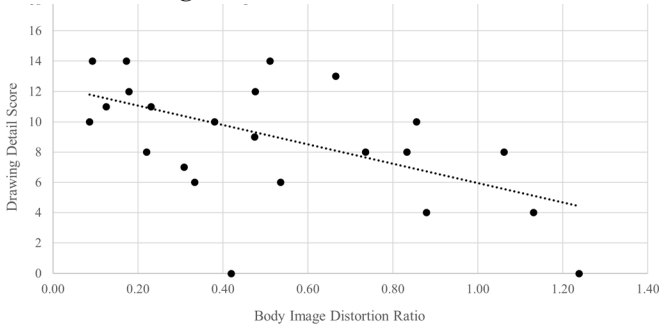
Results

Comparing BID to Drawing Detail Score

A bivariate correlation test of the relationship between total drawing detail score and level of body image distortion revealed a significant, negative correlation, $r = -.498$, $p = .007$ (as shown in Figure 1). As drawing score increased by 1 point, BID decreased by .498 points. A simple linear regression was also calculated to predict participants' drawing detail score based on their exhibited level of BID. The regression equation was significant, $F(1,20) = 6.546$, $p = .019$, with an R^2 of .247. Therefore, the model explained 25% of total drawing score variance.

Figure 1

BID vs Drawing Detail Score



Note. Each point on the graph represents the BID and Drawing Detail Score of a single participant (N=24) included within the study. The best-fit line represents a correlation of $r = -.498$.

Both of the main variables within this study—body image distortion ratio and drawing detail score—are composed of scores assigned to each body part measured (arm, leg, torso, and body height). In order to determine if the significant correlation between overall BID ratio and drawing detail score also extends to these individual parts, three correlation tests were calculated. As shown in Table 1, analyses of the correlation between aspect-specific drawing detail and distortion ratios showed no significant correlation for the arm, $r = -.405$, $p = .025$ and torso, $r = -.284$, $p = .089$. There was a significant negative correlation between leg-specific DDSs and leg distortion ratio, $r = -.405$, $p = .025$. As leg drawing score increased by 1 point, leg size distortion decreased by .405 points.

Table 1

Correlation of BID and Drawing Detail Across Aspects

	Pearson's Correlation Coefficient, *r*	Significance (1-tailed), *p*
Arm Drawing Score vs Arm Ratio	-.285	.089
Leg Drawing Score vs Leg Ratio	-.405*	.025
Torso Drawing Score vs Torso Ratio	-.284	.089

Note. An asterisk (*) denotes statistical significance ($p < .05$)

Finally, tests between two possible mediators, age and gender, and the two main study variables - BID and drawing detail score - were calculated to determine their relationship. The correlation tests revealed no statistically significant correlations between age and BID, $r = -.367$, $p = .093$, or age and drawing detail, $r = .297$, $p = .090$. Following the correlation tests, t-tests revealed no statistically significant differences between male ($M = 8.118$, $SD = 4.456$) and female ($M = 11.125$, $SD = 3.227$) drawing detail scores, $t(23) = 1.702$, $p = .102$. As well, male ($M = .579$, $SD = .364$) and female ($M = .360$, $SD = .216$) body image distortion ratios were not significantly varied, $t(22) = -1.478$, $p = .154$.

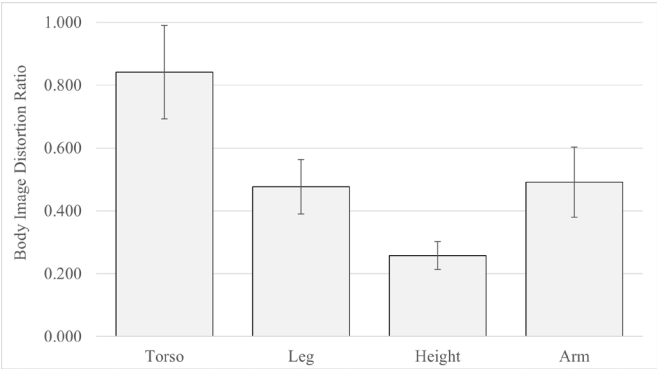
Table 2

Correlations Between Possible Mediators and Study Variables

	Pearson's Correlation Coefficient, *r*	Mean Difference	Significance (2-tailed), *p*
Gender vs BID	-	-.219	.084
Gender vs Drawing Score	-	3.007	.071
Age vs BID	-.367	-	.093
Age vs Drawing Score	.296	-	.090

Figure 2

Comparison of BID Ratios Across Aspects



Participants also exhibited a lower average BID when specifically asked about their full body height (M = .258, SD = .220) as compared to their arms (M = .491, SD = .547). This difference was statistically significant, $t(23) = 2.449$, p = .022, and represented a medium effect, d = .500. A similar difference was observed when comparing participants' average leg distortion (M = .477, SD = .424) to the average height distortion (M = .258, SD = .220). This effect was also statistically significant, $t(23) = 2.825$, p = .010 and represented a medium effect, d = .577.

Discussion

Comparing BID to Drawing Detail Score

In a review of existing literature, it appears that this is the first study to show the correlation between level of drawing detail and body image distortion within the preschool age group. An analysis of collected data revealed support for the main hypothesis: there exists a statistically significant negative correlation between BID and drawing detail that is not mediated by age or gender. Additionally, the way that children view their torso and full height are significantly more and less distorted than their other body parts, respectively.

The results display that children who have a more distorted view of the size of their bodies are not as good at drawing them, which is consistent with the theory presented at the beginning of this paper. Specifically, for every .498-point increase in distortion, there was a 1 point increase in the measured level of detail in the child's drawing. It is crucial to note, however, that this correlation was present when looking at the average body image distortion ratio as compared to the total drawing detail score. As referenced in Equation (1), each body part was given its own individual ratio of distortion, which were all combined into Equation (2) in order to find the total body distortion. Additionally, when quantifying the detail in each participant's self-portrait, they were assigned scores out of 6 in four categories – arms, legs, torso, and general. As referenced in Table 1, the significance of the correlation described above is lost when looking at these specific body parts and their individual distortion ratios and drawing scores, with only the legs following a similar significant relationship.

As stated by Farokhi and Hashemi (2011), the level and way that a child understands and is conscious of their surroundings affects the way that they draw. It is understandable then that both age and gender could be influences on both a child's awareness of their own bodies and, thus, their drawing ability (Baraheni et al., 2018; Picard & Gauthier, 2012; Mori et al., 2023, Cattelino et al., 2014). For this reason, tests analyzing the relationship between all four variables – gender, age, body image distortion, and drawing detail – were run to determine if age or gender had a mediating effect on the studied correlation. The t-tests measuring differences across gender revealed no statistically significant differences in the average body image distortion scores or drawing detail scores within the current study population (as shown in Table 2). Therefore, it is not a viable mediator. Similarly, a correlation test run on participant age revealed it had no significant correlation with body image distortion and drawing detail score in this group (as shown in Table 2). These findings are contradictory to the existing literature, as they propose

that gender and age are not impactful on this area of study. However, this does not discount the existing findings or their claims. Rather, the very small age range of participants – from 48 to 63 months – likely limited the opportunity to see much variation in skill level due to age. Additionally, the sample consisted of 65% (17) male participants, which could have reduced the apparent impact of gender on the measured variables.

Table 3

Comparison of BID Ratios Across Aspects

	Mean Difference	Significance (2-tailed), *p*
Arm vs Torso Ratio	-.350	.060
Leg vs Torso Ratio	-.365*	.032
Arm vs Height Ratio	.233*	.022
Leg vs Height Ratio	.219*	.010

Note. An asterisk (*) denotes statistical significance ($p < .05$).

Perception Distortion of Individual Body Parts

A spurious finding of the present study arose when the average levels of distortion of the children's body parts were compared. In this population, children exhibited a significantly higher level of distortion in their torso than any other body part – apart from their legs – and a significantly lower height distortion. This both supports and contrasts claims made in a study by Speranza and Ramenzoni (2022). In their study, which the current study's method of measuring body image distortion is based on, they found that their population had a much higher level of distortion when guessing the length of their torso than their arms, legs, or full height, when using a baton as a unit of measurement (Speranza & Ramenzoni, 2022). However, they found that the participants had a higher level of distortion in their full height estimates than that of their legs or arms (Speranza & Ramenzoni, 2022). This might be due to their inclusion of distortion directionality within their data set, with a negative score indicating an underestimation and a positive score indicating an overestimation (Speranza & Ramenzoni, 2022). The current study instead presents scores as the magnitude of distortion, disregarding its direction.

These new results could reflect a trend of familiarity with the aforementioned body parts within the study sample. When performing the procedure, many children were unaware of what a torso included and needed an explanation in order to proceed with the instructions. However, many were excited to guess their height, referencing comments from family or friends about their growth. With so much attention placed upon height and nearly none on torso length, one can understand why a child would be more aware of, and place more value upon, their height.

Limitations and Future Directions

Sample Limitations

Although these findings are indicative of a possible cognitive relationship, the present study which produced them is not without limitations. Due to the scope of available time, resources, and local participants, some shortcuts were necessary in order to complete the study. First and foremost, the results found here are based on a non-probability sample. Participants were selected from pre-schools on a convenience basis, as easy access to the pre-schools via proximity allowed for timely completion of the project. Additionally, the parents of all students within the schools were offered the opportunity to opt-in their children, and any child whose parents submitted the permission form was automatically included in the study. Therefore, the sample selection was not random within the pre-schools. This also limited the size of the sample, as requiring parents to sign and remember to return a consent form shrank the already-small number of students in the pre-schools. The findings were still statistically significant - despite such a small sample – however, larger sample sizes have the potential to reveal either a strengthened or weakened relationship. For these reasons, more studies would need to be performed with larger, randomized samples from more widespread geographic areas in order to lessen risk of unintentional biases within the results of this study.

Measure Limitations

When the first participants were evaluated for body image distortion, an unplanned and spontaneous selection of a block was used for them to guess the length of their body parts. These selected blocks were all 6 inches long. In order to maintain consistency between

measurements, this same set of blocks was used with every participant. However, part way through the study, it became clear that the length of the block resulted in a limitation of potential accuracy of estimation. Because the block was 6 inches long, it was difficult for the children to fine-tune their estimate. Rather than being able to guess down to the inch, participants were forced to decide which 6-inch increment was closest to the size of their body parts. In future studies, smaller blocks would be more beneficial and allow for more accuracy in measuring participant estimates.

Because an outdated rubric had to be updated to quantify the level of detail in each child's self-portrait, there is a potential for a lack of accuracy or validity of the measure. As mentioned when introducing the technique, an Intraclass Correlation Coefficient test revealed an excellent interrater reliability. However, it is still unproven that the rubric was effective in measuring the included level of detail in each drawing. In order to establish such content validity, perhaps the method should be compared to an established and proven accurate measure of drawing quality, even if such a measure does not quantify the exact same contributor.

Future Directions

Due to the lack of research in this specific area of child psychology, there are many questions that might emerge from the findings presented here. For instance, with adolescents' increasingly complex self-concept and reliance on body-focused media, it may be beneficial to explore the results of performing a similar test on older age groups (Neves et al., 2017). Of course, in such a case, the criteria for the drawing rubric and the procedure for obtaining a measurement of BID should be adjusted to better fit the new age sample. However, the results of such an adjusted version could provide valuable information about an adolescent's self-perception and serve as a basis for proactive measures that promote positive self-image.

Additionally, the scope and structure of this study prevented causational conclusions from being drawn and instead resulted in only statistical links between measures. While this data is valuable in its own right, understanding the causes of the neural link between drawing and self-perception could provide a greater foundation for actionable next steps and better support caregivers in caring for their child once they discover potentially concerning levels of distortion represented through drawings. After all, a more effective application of research findings on everyday life problems establishes a more lasting and widespread impact of the research across communities.

Conclusion

Body size perception largely influences a child's attitudes towards their body, with children who believe – whether accurately or not – that they fall outside of their ideal size being more at risk for weight management behaviors (Song et al., 2015). A majority of pre-school children's body image attitudes are derived from the home environment, making it easy for guardians to maintain their children's healthy mindset (Birbeck & Drummond, 2006). However, as children begin elementary school, media ideals and social comparison become more and more influential (Neves et al., 2017). The intended purpose of this study was to give parents and other notable people in children's lives a way to begin monitoring their internal perception of their bodies at an earlier age. The findings presented here help to further progress towards this goal, as a relationship between drawing detail and body distortion provides an age-appropriate basis for these conversations. With proper implementation, this early introduction of positive body image perspective may help prevent perception distortion from causing the well-known and dangerous bodily distress later on.

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Appendix

Drawing Detail Evaluation Rubric

1a) Arms present	
1b) Shown in 2 dimensions	
1c) Elbow joint shown	
1d) Hands shown as distinct from fingers or arms	
1e) Fingers shown	
1f) Correct number of fingers shown	
2a) Legs present	
2b) Shown in 2 dimensions	
2c) Legs attached at two separate points on body	
2d) Knee joint shown	
2e) Feet shown as distinct from legs	
2f) Feet placed perpendicular to legs	
3a) Torso present	
3b) Shown in 2 dimensions	
3c) Both arms and legs attached to torso	
3d) Arms connected with defined shoulders	
3e) Legs connected with defined hips	
3f) Length greater than breadth	
4a) Head present	
4b) Hair present	
4c) Eyes present	
4d) Nose present	
4e) Mouth present	
4f) Ears present	