

Physical Activity and Functional Body Image in Youth with and without Visual Impairments

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By

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### Abstract

Recent research has found a positive relationship between functional body image and physical activity in typically developing youth; however, functional body image has not been studied in youth with visual impairments (VI). Youth with VI tend to have a lower body image and engage in less physical activity than their sighted peers. The purpose of this study was to determine differences in functional body image between youth with and without VI and the relationship between functional body image and physical activity in youth with VI. Twenty youth with VI and 20 youth without disabilities completed the Embodied Image Scale and the organized sport (OS) and active physical recreation (AR) activity categories of the Children's Assessment of Participation and Enjoyment (CAPE), which measures five dimensions of activity participation. Mann-Whitney U tests revealed that participants with VI had lower functional satisfaction ( $p = .006$ ) and investment ( $p = .059$ ) than participants without disabilities. The correlation analysis revealed several significant positive relationships: functional values with AR where ( $r = .472$ ), functional satisfaction with AR intensity ( $r = .459$ ) and AR enjoyment ( $r = .501$ ), and functional investment with AR ( $r = .554$ ) and OS enjoyment ( $r = .655$ ). There were significant negative relationships between functional investment and AR diversity ( $r = -.475$ ) and intensity ( $r = -.501$ ). This suggests that youth with VI have lower satisfaction and investment in their functional body image; however, those that enjoyed OS and AR activities tended to be more satisfied and invest more in their functional body image.

## **Physical Activity and Functional Body Image in Youth with and without Visual Impairments**

Body image relates to someone's thoughts and feelings about their body and may range from positive to negative. Body image is linked to many adverse physical and psychological variables, such as disordered eating (Johnson & Wardle, 2005) and depression (Paxton et al., 2006). It has also been found to have a positive relationship with self-esteem (van den Berg et al., 2010) and physical activity (Gaspar et al., 2011) for typically developing youth. However, these studies are limited in that they focus only on aesthetic body image (i.e., how individuals view their body's appearance) and do not account for functional body image, which focuses on how individuals view their body's ability to function. Functional body image only includes physical activity but also the body's internal functions. Similar to aesthetic body image, functional body image is thought to encompass three dimensions: affective (i.e., satisfaction with one's body), cognitive (i.e., value of one's body), and behavioral (i.e., investment in one's body). Both aesthetic and functional body image contribute to one's overall body image; however, functional body image may provide a more objective and positive means of evaluating one's body by directing the focus on what the body can do rather than what it looks like. In fact, Abbott and Barber (2010) found that typically developing youth tend to be more satisfied with their functional body image than their aesthetic body image.

Sonstroem and Morgan's (1989) theoretical framework may provide an understanding for how physical activity can help increase an individual's functional body image as well as their self-esteem. This framework posits that there is a relationship between physical self-efficacy (one's belief in their ability to successfully perform a certain activity), physical competence (one's evaluation of their overall fitness level), and physical acceptance (the amount of

satisfaction one has with the parts of their body), which all contribute to an individual's self-esteem. Moreover, the framework suggests that physical activity can improve all of these variables. Even though the variables within this framework are all independent, they must be examined in relation to each other in order to determine the impact on self-esteem. For example, an exercise or physical activity intervention that has a positive impact on one's performance will increase their physical self-efficacy for that specific activity. This, in turn, will increase the individual's physical competence, which should increase their self-esteem. An increase in physical competence can also increase an individual's body satisfaction (i.e., physical acceptance), which would also increase their self-esteem.

There is limited research examining the relationship between physical activity and functional body image. In one study, Abbott and Barber (2011) examined differences in the body image of girls who participated in sport, physical activity (e.g., gym, walking), or physical non-activity. They found that girls who participated in sport or physical activity had a higher value and investment in their functional body image compared to those who were sedentary; however, those that participated in sport valued and invested more in their functional body image more than those that were physically active. Thus, it appears that sport participation may have a larger influence on functional body image than physical activity.

In another study, Allen and colleagues (2019) looked at the impact of sports participation, opinions on physical education, and everyday physical activity on children's functional body image. The researchers hypothesized that individuals with higher rates of physical activity, positive attitudes towards PE, and that participate in sports are more likely to have a higher functional body image. They also hypothesized that gender would affect these results. To test these hypotheses, the researchers studied 300 children ages 9 to 12 years. The children filled out

an Embodied Image Scale, an attitude towards PE questionnaire, and wore accelerometers for a week. They were also measured on BMI and participation in sports or dance clubs. The results showed that children that held more positive attitudes towards PE also had higher functional body image. It also showed that not participating in sports had a negative effect towards functional body image, more so for girls than boys. Everyday physical activity also had a positive effect on functional body image, but it differed between males and females.

Youth with visual impairments tend to have poorer body image (Pinquart & Pfeiffer, 2012) and lower levels of physical activity (Haegele & Porretta, 2015) and motor competence (Wagner et al., 2013) than their typically developing peers. One reason for these trends is the lack of opportunities of youth with visual impairments have to engage in physical activity. For example, Haegele and Porretta (2015) found that youth with visual impairments saw themselves as overweight because they never got proper exercise due to being shunned in physical education classes. Moreover, Mikeska and colleagues (2016) found that many individuals with visual impairments' only form of physical activity is in physical education classes. This suggests that as individuals with visual impairments get older, they become less active due to decreased opportunities. Without opportunities to be physically active, youth with visual impairments will continue to have low body image, which will negatively impact their self-esteem.

Given the limited research on the relationship between physical activity and functional body image and that evidence is limited and only focuses on typically developing youth, the purpose of this study is to examine physical activity and functional body image in youth with and without visual impairments. If physical activity has a positive influence on functional body image for youth with visual impairments, it is important to come up with ways to help

them become more active as youth and throughout their lifespan in order to increase their self-esteem and avoid adverse physical and psychological outcomes.

My first research questions is “What is the difference in functional body image between youth with visual impairments and their typically developing peers?” My hypothesis is that youth with visual impairment will have a lower functional body image than youth that are typically developed. My second research question is “What is the relationship between functional body image and physical activity within youth with visual impairments?” My hypothesis for this question is that there will be a positive relationship between functional body image and physical activity.

## **Methods**

### **Participants**

Participants with visual impairments were recruited through a Camp Abilities email list as well as through the National Federation of the Blind listserv. The sample consisted of 20 boys (n=12) and girls (n=8) ages 6-17 ( $M = 11.7$ ,  $SD = 3.4$ ) years. All levels of visual impairments were represented in the sample: 30% B1 (totally blind), 5% B2 (20/600 and up), 10% B3 (20/200-20/599), 20% B4 (better than 20/199), and 35% did not specify. Participants without disabilities were recruited via social media. The sample consisted of 20 boys (n=9) and girls (n=11) ages 8-17 ( $M = 10.25$ ,  $SD = 2.6$ ) years. All participants had typical vision. There were no significant differences in age ( $t(38) = 1.52$ ,  $p = .14$ ), gender ( $\chi^2(1, N = 40) = .90$ ,  $p = .34$ ), or ethnicity ( $\chi^2(4, N = 40) = 9.09$ ,  $p = .059$ ). between the two groups of participants.

## Measures

### *Children's Assessment of Participation and Enjoyment*

The Children's Assessment of Participation and Enjoyment (CAPE) is a questionnaire made up of 55 items that measures five dimensions of participation (diversity, intensity, with whom, where, and enjoyment) and has good psychometric properties for youth (6-21 years old) with and without disabilities (King et al, 2004; King et al., 2007). For each item of the CAPE, an activity is named (e.g., doing puzzles) and a corresponding image is given. We used image descriptions for each item developed by Perreault and colleagues (in press) so that the measure was accessible and standardized for the participants with visual impairments. For each item, the child is asked, "Have you done this activity in the past four months?" If the child responds "no", then they move to the next question. If the child responds "yes", then the child is assessed on how often, with whom, where, and enjoyment. The number of activities the child does represents the *diversity* dimension. The *intensity* dimension is assessed by asking how often the activity is done on a Likert scale of 1 to 7 with 1 being "1 time in the past four months" and 7 being "one time a day or more." The *with whom* dimension is assessed on a scale of 1 to 5: (1) alone, (2) with family, (3) with other relatives, (4) with friends, and (5) with others. If the child has done this activity with more than one person, the option with the highest score is chosen. The *where* dimension is assessed on a scale of 1 to 6: (1) at home, (2) at a relative's home, (3) in your neighborhood, (4) at school (but not during classes), (5) in your community, and (6) beyond your community. The *enjoyment* dimension is assessed with a Likert scale from 1 to 5 with 1 being "not at all" and 5 being "love it".

Two activity categories were used from the CAPE: organized sport (OS; e.g., martial arts, swimming) and active physical recreation (AR; e.g., dancing, snow sports). We chose to use

these activity categories because they represent active physical activities, such as swimming and doing team sports, as opposed to sedentary activities. Many of the other activity categories, such as *hobbies, crafts, and games* or *quiet recreation* focused on more sedentary activities. For each activity subcategory (OS and AR), scores for the five dimensions were calculated based on guidelines in the manual (King et al., 2004). *Diversity* was calculated by summing the number of activities participants reported participating in; *intensity* was calculated by summing responses to the frequency question and then dividing by the total number of activities; *with whom, where, and enjoyment* were calculated by summing responses to the respective questions and dividing by the number of activities participants reported participating in.

### ***Embodied Image Scale***

The Embodied Image Scale (EIS) measures functional and aesthetic body image across three dimensions: affective (i.e., satisfaction with one's body), cognitive (i.e., value of one's body), and behavioral (i.e., investment in one's body). The EIS consists of 19 questions divided across six subscales: (1) aesthetic values (e.g., *How good I feel about my body depends a lot on how I look.*), (2) aesthetic satisfaction (e.g., *I feel really good about the way I look.*), (3) aesthetic behavioral-investment (e.g., *I always try to look the best I can.*), (4) functional values (e.g., *How good I feel about my body depends a lot on what my body can do physically.*), (5) functional satisfaction (e.g., *I feel really good about what I can do physically.*), and (6) functional behavioral-investment (e.g., *I always try to physically challenge myself during physical activities.*). Only the functional body image subscales were used in this study. Each item was rated on a 5-point Likert scale ranging from 1 – *not at all true for me* to 5 – *very true for me*. Subscale scores represent the average score across individual items within the corresponding

subscale. Previous research has found the EIS to have adequate internal consistency for children and adolescents 9 to 18 years old (Abbott & Barber, 2010; Allen et al., 2019).

### **Procedure**

This study was approved by the college's Institutional Review Board, and informed consent from legal guardians and assent from participants was obtained prior to data collection. Data was collected using an online questionnaire distributed through Qualtrics. Participants completed the online questionnaire with the aid of a parent or caregiver when needed.

### **Data Analysis**

To analyze the data, separate Mann-Whitney U tests were conducted to examine differences in functional body image and the *with whom*, *where*, and *enjoyment* dimensions of the OS and AR subcategories of the CAPE between the participants with and without visual impairments. Independent samples t-tests were used to examine group differences for the *diversity* and *intensity* dimensions of the CAPE. Spearman rank-order correlations were used to examine the relationship between the three dimensions of functional body image and the five dimensions of the CAPE for each sample.

## **Results**

### **Differences in Functional Body Image and Physical Activity**

The analysis revealed some significant differences in functional body image between children with and without visual impairments (see Table 1). Functional values did not differ between the children with and without visual impairments. However, there was a significant difference in functional satisfaction ( $U = 99, p = .006, r = .44$ ), wherein participants with visual impairments (Mdn = 3.50) had lower scores than participants without disabilities (Mdn = 4.67). There was also a marginally significant difference in functional investment ( $U = 130.5, p = .059$ ,

$r=.30$ ), wherein participants with visual impairments (Mdn = 2.84) had a lower score than participants without disabilities (Mdn = 4.17).

For physical activity, the analysis indicated only a significant difference in *where* scores for AR ( $U=101$ ,  $p = .012$ ,  $r = .40$ ); wherein participants with visual impairments (Mdn = 2.47) had lower scores than the participants without disabilities (Mdn = 3.57).

### **Relationship Between Functional Body Image and Physical Activity**

For participants with a visual impairment, the correlation analysis revealed several significant positive relationships. Functional satisfaction and functional investment had a significant positive relationship with one another ( $r = .605$ ,  $p = .005$ ); however, functional values was not significantly related with either functional satisfaction ( $r = .061$ ,  $p = .799$ ) or functional investment ( $r = .186$ ,  $p = .431$ ). Additionally, functional values had a moderate relationship with AR where ( $r = .472$ ,  $p = .036$ ), functional satisfaction had moderate relationships with AR intensity ( $r = .459$ ,  $p = .042$ ) and AR enjoyment ( $r = .501$ ,  $p = .025$ ), and functional investment had moderate to strong relationships with AR ( $r = .554$ ,  $p = .011$ ) and OS enjoyment ( $r = .655$ ,  $p = .002$ ). Interestingly, functional investment also had significant negative relationships with AR diversity ( $r = -.475$ ,  $p = .034$ ) and AR intensity ( $r = -.501$ ,  $p = .025$ ).

Similar to the participants with visual impairments, functional satisfaction was significantly related to functional investment ( $r = .805$ ,  $p < .001$ ) for participants without disabilities, and neither functional satisfaction ( $r = .145$ ,  $p = .542$ ) nor functional investment ( $r = .137$ ,  $p = .565$ ) were significantly related to functional values. There was also a significant positive relationship between functional investment and AR enjoyment ( $r = .524$ ,  $p = .02$ ). All other correlations were non-significant.

## Discussion

In this study, we examined differences in functional body image between youth with and without visual impairments. We found that youth with visual impairments value their functional body image similarly to their typically developing peers. Despite similar values, we found that youth with visual impairments were less satisfied with, and invested less in, their functional body image compared to their typically developing peers. This is interesting given that we found no differences in the *diversity* and *intensity* of participation in OS and AR activities between youth with and without visual impairments despite previous research that suggests youth with visual impairments engage in less physical activity than youth without disabilities (Haegele & Porretta, 2015). However, previous research has found that youth with visual impairments face many barriers related to physical activity settings, such as prejudice, lack of modifications, and inadequate instruction (Linsenbigler et al., 2018). Thus, it may be that the quality of physical activity settings rather than the amount of participation limits their ability to invest in, and become satisfied with, their functional body image.

In addition to the lack of differences in the *diversity* and *intensity* of participation, we found no differences in *whom* the youth participated with and their amount of *enjoyment*. However, we did find that youth with visual impairments differ in *where* they participate in certain activities as compared to their typically developing peers. Specifically, youth with visual impairments tend to participate in AR activities closer to home than youth without disabilities. This is similar to the findings of Engel-Yeger and Hamed-Daher (2013) who compared participation in out of school activities between youth with and without visual or hearing impairments. They found that youth with visual or hearing impairments participate in activities closer to home because it is a familiar environment where they can receive help from family.

Lack of accessible facilities (Shields et al., 2012), a common barrier to physical activity for youth with disabilities, may also explain why these participants were more likely to participate closer to home.

We also examined the relationship between functional body image and physical activity within youth with visual impairments. We found that the more they value their functional body image, the higher their *where* scores were for AR activities. This indicates that youth with visual impairments who place higher value on their functional body image tend to travel farther from home to participate in recreational activities. However, we did not find a similar trend for OS. We also found that the more satisfied youth with visual impairments are with their functional body image, the more often they participate in, and enjoyed, AR activities. This finding is consistent with Sonstroem and Morgan's (1989) framework, which suggests that physical activity has a positive impact on performance that can increase the individual's physical competence and, in turn, increase their body satisfaction (i.e., physical acceptance). Moreover, research suggests a reciprocal relationship between physical activity and motor competence for children and adolescents (Lima et al., 2016). Thus, youth with visual impairments may become more satisfied with their functional body image by gaining motor competence through physical activity, which may, in turn, drive them to participate in more physical activity.

We also found that the more invested youth with visual impairments are with their functional body image, the more they enjoyed both AR and OS activities. Higher frequencies of physical activity have been associated with physical activity enjoyment (Seabra et al., 2013); however, we found that youth with visual impairments who invested more in their functional body image participated in fewer types of AR activities and less often. This finding suggests that individuals who invest more in their functional body image focus on a specific activity rather

than spreading themselves among different activities. Nevertheless, some of the barriers mentioned previously could account for lower responses on some of the items used to measure functional investment. For example, it would be challenging to “participate in physical activities whenever I can” if there is a lack of adequate facilities, instruction, and modifications readily available in physical activity settings. Thus, more research is needed to understand the connection between physical activity participation and functional investment in youth with visual impairments.

For youth without disabilities, we found a positive relationship between functional investment and enjoyment of AR activities. As this was the only relationship we found in our control group, it appears that participation in physical activity may be more important for youth with visual impairments for improving functional body image than youth without disabilities. Thus, there is a need for further study to examine the effects of physical activity interventions on functional body image in youth with visual impairments.

### **Limitations**

One limitation of this study is that the majority of the participants with visual impairments were recruited from the mailing list of a sports camp for individuals with visual impairments. Although the surveys were administered prior to the camp, these participants may already have higher levels of physical activity or more interest in physical activity compared to those who did not sign up to attend the camp. Thus, the findings of this study cannot be generalized to all youth with visual impairments. Another limitation of this study is that some of the concepts of body image may have been challenging for young children to understand. One of our participants was as young as 6 years old so this may not be a concept they are familiar with,

which could have affected how they answered.. However, the surveys were administered with the aid of a parent or guardian to assist the participant in understanding the content of each item.

The findings of the current study suggest there are positive relationships between physical activity and functional body image in youth with visual impairments; however, a causal relationship between these variables is unclear. Thus, future research should examine the influence of a physical activity intervention on functional body image in youth with visual impairments. Additionally, future research should also examine functional body image in a more representative sample of youth with visual impairments to increase ecological validity as well as examine potential age and gender differences.

### **Conclusion**

The purpose of this study was to determine differences in functional body image between youth with and without visual impairments and the relationship between functional body image and physical activity in youth with visual impairments. Our results suggest that youth with visual impairments have lower satisfaction and investment in their functional body image; however, those with higher enjoyment in OS and AR activities were more satisfied with, and invested more, in their functional body image. Therefore, it may be beneficial to find ways to increase physical activity levels for youth with visual impairments and make physical activity more accessible in order to improve their functional body image.

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**Table 1.***Comparison of Functional Body Image Scores Between Youth with and without Visual Impairments*

	Visual Impairment (n = 20)		Controls (n = 20)		z	p	r
	Median	Mrank	Median	Mrank			
Functional Values	3.50	21.50	3.50	19.50	.55	.59	.09
Functional Satisfaction	3.50	15.45	4.67	25.55	2.76	.006	.44
Functional Investment	2.84	17.02	4.17	23.98	1.89	.059	.30