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ACCESS TO PHYSICAL ACTIVITY

ACCESS TO PHYSICAL ACTIVITY: HOW DOES ACCESS TO PHYSICAL ACTIVITY IN
DEAF ADOLESCENCE AFFECT THEIR ACTIVITY LEVELS IN COLLEGE?

A PROJECT IN
Health and Well-being Management

Presented to the Faculty of the Rochester Institute of Technology in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE IN HEALTH AND WELL-BEING MANAGEMENT

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ACCESS TO PHYSICAL ACTIVITY

Advisor Approval

12/13/21

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ABSTRACT

Background: Individuals who identify as deaf and hard of hearing are overlooked or excluded from public health research, surveillance, and outreach and education programs. Studies have shown that there is a connection between motor skill development in children and their participation in physical activities. Generally, deaf children lag in motor skill development when compared to their hearing peers, and these developmental discrepancies can be minimized with increased participation in physical activity and sports.

Purpose: This project involved the creation and validation of a survey that retrospectively assessed how both parental hearing status and the number of barriers experienced by a deaf individual impacts their level of activity while in college. The goal of this research is to use the end survey to gain knowledge in this field.

Methods: This study utilized both student participants and expert participants. Experts reviewed, graded, and gave suggestions to ensure content validity of the survey. Student participants were recruited through email, and data was gathered through think aloud interviews and anonymous survey completion.

Results: Based on the kappa results, 31 out of 32 questions were ranked as excellent and all questions were relevant to the study. The probability of chance agreement for five questions were each 0.3125, and 0.0313 for the remaining 27. Twelve students took the survey anonymously; however, ten out of the 12 were excluded based on age or hearing status.

Discussion: Overall, the survey scored well, but it is imperfect. Expert review of the survey showed excellent content agreement, however, only one was from a physical education background. The ratio of experts from both disciplines (physical education and deaf studies)

should have been obtained. Also, the number of student survey participants needs to occur to allow for a Cronbach alpha calculation. There were only three interview participants utilized in this study, and all were male, meaning struggles experienced by individuals of other genders were not included. There is not enough data to show that the created survey is useful and adequately assesses how both parental hearing status and number of barriers experienced affects a deaf individual's level of physical activity during their college years.

INTRODUCTION

In the United States, more than 15% of adults are sedentary.¹ When looking back on national health survey results, an increase in inactivity and obesity can be seen through the general population.² These increases are not accompanied by an overall increase in the number of calories consumed, but are accompanied by a decrease in leisure-time physical activity.² This inactivity and obesity can get progressively worse over time if not addressed, and can lead to serious health problems later in life. In the United States, there are also populations that experience higher rates of disease and death when they are compared to the general population. These populations can be broken up by characteristics like ethnicity, race, sex, or gender.³ One minority group that does not fall into one of the aforementioned groups is the deaf and hard-of-hearing population. Individuals who identify as deaf and use American Sign Language (ASL), and individuals who have hearing loss (hard-of-hearing) make up a population that also struggles with health disparities.⁴ These individuals are also overlooked or excluded from public health research, surveillance, and outreach and education programs.⁴

Three out of every 1,000 children in the United States are born with hearing loss in one or both ears⁵, and of those children, over 90% of them are born to hearing parents.⁶ Deaf children often cannot communicate with their family members and end up learning about the world from their deaf peers.⁴ Unfortunately, many hearing individuals view deafness as an ailment that needs to be “fixed”, and this mentality is most common in healthcare and school settings.⁴ Because of this, a deaf individual may not be willing to participate in healthcare research and programs because of early and potentially traumatic experiences. This could explain the lack of data representing the deaf and hard-of-hearing community.⁷ Of the studies done in the deaf community, many focus on children. This lack of health information and the health disparities

experienced by deaf and hard-of-hearing individuals means that it is even more critical that researchers study this population. This would allow for improvements in health and an increase in quality of life for these individuals.

Studies have shown that there is a connection between motor skill development in children and their participation in physical activities.⁸ Generally, deaf children lag in motor skill development when compared to their hearing peers, and these developmental discrepancies can be minimized with increased participation in physical activity and sports.⁸ Studies have also shown that deaf children show signs of similar or slightly lower fitness levels when compared to hearing children, and a higher chance of being overweight when compared to fitness standards.^{8,9} When studying deaf children between the ages of 6 and 11, Ellis et al. found that the deaf male participants were above the 85th percentile of BMI across all ages, with girl participants having similar results, but only for ages 6, 7, and 10.¹⁰ According to the CDC, this makes these children at risk of being overweight.¹⁰ Furthermore, differences have been seen in the fitness levels between deaf children in public schools versus those placed in schools for the deaf.¹⁰ These results are important as they show that deaf children are already behind in motor skill development and fitness levels when compared to hearing children. This becomes important later in life for these children, as being physically active early in life helps to prevent future decreases in physical fitness.⁸

One factor that can influence the activity level of a deaf child is the hearing status of their parents. Deaf children with two deaf parents are more likely to be involved in sports and demonstrate higher fitness levels.⁸ Children who are from households with two deaf parents scored 13.5% higher on the Fitnessgram than children from households with two hearing parents, and 11.4% higher than children with one deaf parent and one hearing parent. This could be

because the parents may have a better understanding of their children and their struggles, a greater awareness of the deaf community and deaf sports, or could communicate the values of physical activity and sports to their children.⁸ Communication between parents and children is critical within the family dynamics and can lead to greater involvement from the parents in similar interests in physical activities. With this involvement in physical activities, a deaf child may also get involved in deaf sports or other group physical activities⁸. The results from an Ellis et al. study showed a significant difference between parents' value of their children's fitness level when they were categorized by their hearing status. Specifically, there was more value towards sports participation in families with two deaf parents ($M = 3.59$, $SD = 0.51$) than two hearing parents ($M = 3.00$, $SD = 0.00$).⁸ From the published research, a gap can be identified. Currently, no survey exists to assess how both parental hearing status and barriers like crime, pollution, lack of money, lack of transportation, fear of injury, etc. can affect a deaf or hard of hearing individual's physical activity levels. Therefore, this study aimed to create and validate a survey to assess this connection.

METHODS

Participants

This study utilized both student participants and expert participants. The expert group consisted of five individuals in the fields of physical activity and deaf education. An expert was defined as an individual who has received a graduate degree in their field, and has five or more years of experience in that field.

Student participants were identified as deaf or hard-of-hearing at the Rochester Institute of Technology. There were a total of 15 students who participated in this study. The participants

ranged from 18 to 25 years old. The age of 18 was chosen as parental consent would not be required to participate in the study, and 25 because it represents the top end of the age range for students who attend an undergraduate four-year degree program in the United States.¹¹ Students were excluded from this study if they identified as a hearing individual, or were diagnosed with deafness after the age of three. According to the CDC, all babies should be screened for hearing loss no later than one month of age, and if a baby does not pass the screening, it is important that they receive a full hearing test no later than three months of age.¹² If a child is at risk for delayed-onset, progressive, or acquired hearing loss, they will receive at least one hearing test by 2 to 2 ½ years old, so by that age the child could be diagnosed with delayed-onset hearing loss. Delayed-onset hearing loss is defined as hearing loss that develops after the baby is born.¹²

Survey

The survey was created using Qualtrics© (Provo, UT), and an anonymous link was sent out to all NTID students via an NTID email list. This survey contained 32 questions and assessed a student's access to physical activity when growing up, along with their current level of physical activity as a college student. The survey asks participants about their hearing status, the hearing status of their parents, barriers they may have encountered to physical activity while in their adolescence, geographic location of their school, and the types of physical activity or sports participation were available to them during their pre-college years. These questions were created using the recommendations from the researchers in the Ellis et al. study⁸ and used questions from the International Physical Activity Questionnaire (IPAQ).¹³ The IPAQ is a validated for use with individuals aged between 15 and 69, and can be used both clinically and in population research that compares activity levels between different populations.¹⁴ For a full list of questions, refer to Appendix A.

Prior to students completing the survey, it was first sent to a cohort of experts to assess content validity. Based on expert scoring, questions were added, removed, and altered. Experts were also able to provide qualitative notes for each question.

Once finalized, the survey was sent out to the student participants. They were contacted using the NTID email list and assistance from the office of the Associate Dean for Research. For the full email that was sent out to the students, refer to Appendix B. Out of all of the interested participants, three students were randomly selected to participate in a think aloud interview and the remaining number of participants were given the actual survey to complete.

Think Aloud Interview

The think aloud interviewing protocol requires that the participants go through the survey actively discussing their thoughts as they read and answer each question.¹⁵ Before beginning, participants received a brief description of the survey and were asked for permission to record the interview. These think aloud interviews had fewer probing questions to allow for the participants to answer the way they would normally answer if the interviewer was not there to guide them.¹⁶ This would show that the questions in the survey requested the intended information from the participants.¹⁶ Participants would be asked probing questions like “what are you thinking?” or “can you elaborate?” if they were struggling to discuss their thoughts or tended to be quiet during the interview process.^{15,17} At the end of the interview the participant was asked if there was any portion of the survey that was confusing or that they thought did not fit the objective of the study.

Data Analysis

Analysis of Expert Data

I-CVI

The mean item-wise content validity score (I-CVI) for relevance and clarity were calculated for the questionnaire based off of the experts' ratings on a "grading form".¹⁸ For the full grading sheet, refer to Appendix C. The I-CVI was calculated using the formula: (agreed items/number of experts). Agreed items refer to the number of experts that ranked the questions as having a relevance and clarity as a three or four. The I-CVI was used to express the agreement of relevancy of each item with respect to the number of experts, and this is given in a value between zero and one.^{19,20} An I-CVI greater than 0.79 shows relevance, an I-CVI score between 0.70 and 0.79 means the question needs revision, and an I-CVI score below 0.70 means the item needs to be removed.^{19,20} The I-CVI for clarity was used to assess which questions should be revised. For this evaluation, any question that had an I-CVI score less than 0.79 was revised according to expert suggestions. For the full updated survey, refer to Appendix D.

Table 1. Scoring guide given to experts on grading sheet	
Relevance	Clarity
1 = not relevant	1 = not clear
2 = item needs some revision	2 = item needs some revision
3 = relevant but needs minor revision	3 = clear but needs minor revisions
4 = very relevant	4 = very clear
If a score of 2 or 3 is given please write a suggestion on how to change the question or the choices	

S-CVI_{ave}

The mean scale content validity (S-CVI) was also calculated for the entire questionnaire. Two methods can be used to calculate S-CVI, one is the Average CVI (S-CVI_{ave}) and the second is Universal Agreement S-CVI (S-CVI_{UA}).²⁰ The S-CVI_{ave} was calculated using the following formula: (sum of all I-CVI values/total number of items). S-CVI is used to express

the proportion of items within the survey that achieved a rating of a three or four by the experts.¹⁹ An $S-CVI_{ave} \geq 0.9$ means that there is excellent content validity; however, the $S-CVI_{ave}$ is considered to be the less conservative method to calculate mean scale content, which is why it is usually accompanied by the $S-CVI_{UA}$.²⁰

S-CVI_{UA}

The $S-CVI_{UA}$ was calculated using the following formula: (universal agreement score/total number of items). The universal agreement score is the number of questions in the survey with an I-CVI score of one, or all of the questions that experts scored as a three or four for relevance. For this calculation, a $S-CVI_{UA} \geq 0.8$ means that there is excellent universal agreement of content validity.²⁰

Modified Kappa

A Kappa analysis (k^*) was also done to test for the amount of agreement beyond chance between the professionals for each question, and the overall questionnaire. This was calculated using the formula: $(I-CVI - P_c)/(1 - P_c)$, where P_c is the probability of a chance agreement. P_c was calculated using the following formula: $[N! / A! (N - A)!] * 0.5^N$, where N equaled the number of experts, and A equaled the number of experts who gave a score of three or four to an item. These calculations are identical to those done in previous studies to validate surveys.^{18,19} Kappa was evaluated using the following criteria: $k^* = < 0.40$ is poor, $k^* = 0.40-0.59$ is fair, $k^* = 0.60 - 0.74$ is good, and $k^* = \geq 0.74$ is excellent.²¹

Cronbach's Alpha

Cronbach's alpha is used to express the internal consistency of a group or scale of items, and is expressed as a value between negative one and one. Internal consistency measures how

well a grouping of questions in the survey measures the same concept.²² Based on the number of items in each scale, a cutoff alpha value of 0.7 was utilized to evaluate the reliability of the items in the scale.²² This calculation was done utilizing SPSS[®] (Armonk, NY).

Questions from the survey were grouped based on their similarities and in total there were 5 groups: parental influence, adolescent activity levels, barriers, college access, and college activity levels. Points were assigned to student responses based on a linear scale. For instance, question nine asks whether a student’s parents were physically active, with research indicating that children tend to be physically active if their parents were. Therefore, an answer of “yes” would receive one point, and “no” would receive no points. In the case of a question with more than two choices, the same scale was used. For example, question eight asks about parental hearing status. For this question, an answer of Deaf gave three points, Hard-of-hearing gave two points, one hearing and one deaf/hard of hearing gave one point, and hearing gave zero points. This point system was assigned in this manner as research has shown that children of parents who are deaf are significantly more likely to be involved in sports or have higher activity levels.⁸

RESULTS

Expert Data

Overall, five experts participated in this study, with four in the field of deaf education and one in physical activity/physical education. From the I-CVI relevance scores, no questions were eliminated, and from the I-CVI clarity scores, eight questions were revised to increase overall clarity of the survey. See Table 2. for full details of I-CVI scoring

Items	Relevance (number of	Clarity (number	I-CVI (Relevance)	I-CVI (Clarity)	Interpretations based off I-CVI scores
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	experts rating of 3 or 4)	of experts rating of 3 or 4)			
1	5	0	1	1	Appropriate
2	5	3*	1	0.75	Appropriate, but needs revisions
3	5	0	1	1	Appropriate
4	5	0	1	1	Appropriate
5	5	0	1	1	Appropriate
6	5	0	1	1	Appropriate
7	4	4	0.80	0.80	Appropriate
8	5	0	1	1	Appropriate
9	5	0	1	1	Appropriate
10	5	0	1	1	Appropriate
11	5	3*	1	0.75	Appropriate, but needs revisions
12	5	0	1	1	Appropriate
13	5	2*	1	0.50	Appropriate, but needs revisions
14	4*	0*	1	1	Appropriate
15	5	0	1	1	Appropriate
16	5	3	1	0.60	Appropriate, but needs revisions
17	5	3	1	0.60	Appropriate, but needs revisions
18	5	0	1	1	Appropriate
19	5	3	1	0.60	Appropriate, but needs revisions
20	5	4	1	0.80	Appropriate
21	5	3	1	0.60	Appropriate, but needs revisions
22	5	4	1	0.80	Appropriate
23	5	0	1	1	Appropriate
24	5	0	1	1	Appropriate
25	5	4	1	0.80	Appropriate
26	5	0	1	1	Appropriate
27	4*	3*	1	0.75	Appropriate, but needs revisions
28	5	0	1	1	Appropriate
29	4*	3	1	1	Appropriate
30	4*	0	1	1	Appropriate
31	4*	0	1	1	Appropriate
32	4*	0	1	1	Appropriate
*For these questions, one individual left the scoring blank which did not affect the I-CVI, the number of experts who answered the question was decreased by one					

Based on the kappa results, 31 out of 32 questions were ranked as excellent and all questions were relevant to the study. The survey overall received a $S-CVI_{UA}$ score of 0.96 and a $S-CVI_{ave}$ score of 0.99 which both indicate excellent content validity. The probability of chance agreement (P_c) for five questions was 0.3125 and the remaining 27 was 0.0313 which means that the probability of the experts agreeing randomly was low. Table 3. has full details. Updated survey questions can be seen in Appendix D

Items	Experts (n)	Expert rating of 3 or 4	I-CVI ^a	P_c^b	k^{*c}	Evaluation of k^*
1	5	5	1	0.0313	1	Excellent
2	5	5	1	0.0313	1	Excellent
3	5	5	1	0.0313	1	Excellent
4	5	5	1	0.0313	1	Excellent
5	5	5	1	0.0313	1	Excellent
6	5	5	1	0.0313	1	Excellent
7	5	4	0.80	0.3125	0.709	Good
8	5	5	1	0.0313	1	Excellent
9	5	5	1	0.0313	1	Excellent
10	5	5	1	0.0313	1	Excellent

	parents encourage you to play sports? (i.e. soccer, football, lacrosse, hockey, etc.)						
11	During your adolescence, did you participate in physical activities? (i.e. running, dancing, jump rope, etc.)	5	5	1	0.0313	1	Excellent
12	Select all of the following activities that you participated in during adolescence	5	5	1	0.0313	1	Excellent
13	Did you need an interpreter present to participate in these fitness activities?	5	5	1	0.0313	1	Excellent
14	Did you have interpreting services available during these fitness activities?	4	4	1	0.3125	1	Excellent
15	How did you communicate with the other participants?	5	5	1	0.0313	1	Excellent
16	Select all of the following that were barriers to physical activity for you	5	5	1	0.0313	1	Excellent
17	During the last 7 days, how much time did you spend sitting? (in minutes)	5	5	1	0.0313	1	Excellent
18	During the last 7 days, on how many days did you walk for <u>at least 10 minutes at a time?</u>	5	5	1	0.0313	1	Excellent
19	On average, how many minutes of walking did you perform on the days you were active?	5	5	1	0.0313	1	Excellent

20	During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming, or other fitness activities.	5	5	1	0.0313	1	Excellent
21	On average, how many minutes of moderate physical activity did you perform on the days you were active?	5	5	1	0.0313	1	Excellent
22	During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling?	5	5	1	0.0313	1	Excellent
23	On average, how many minutes of vigorous physical activity did you perform on the days you were active?	5	5	1	0.0313	1	Excellent
24	What types of organized fitness do you currently participate in? Select all that apply.	5	5	1	0.0313	1	Excellent
25	When are interpreting services available to you during NCAA sport participation?	5	5	1	0.0313	1	Excellent
26	Do you have to request interpreting services for each game/practice/etc.?	5	5	1	0.0313	1	Excellent

27	Are interpreting services available to you during fitness classes?	4	4	1	0.3125	1	Excellent
28	Do you have to request interpreting services for each class?	5	5	1	0.0313	1	Excellent
29	When are interpreting services available to you during club sports?	4	4	1	0.3125	1	Excellent
30	Do you have to request interpreting services for each game/practice/etc.?	4	4	1	0.0313	1	Excellent
31	When are interpreting services available to you during intramural sports?	4	4	1	0.3125	1	Excellent
32	Do you have to request interpreting services for each intramural game?	4	4	1	0.3125	1	Excellent
<p>^a I-CVI (content validity index) = (number of experts rating the item a three or four)/(total number of experts)</p> <p>^b P_c (probability of chance occurrence) = [N! /A! (N -A)!]*0.5^N , N=number of experts, A=number that scored item three or four</p> <p>^c k*=κ relevance agreement:(I-CVI -P_c)/(1-P_c)</p> <p>^d Evaluation of k*. scale: < 0.40=poor, 0.40-0.59=fair, 0.60-0.74=good, and > 0.74=excellent²¹</p>							

Think Aloud interviews

Overall, the three interviewers did not find any questions to be confusing, misleading, or offensive. The interviewers all agreed that the questions in the survey were all relevant and addressed the topic appropriately. One interviewee stated that it was very difficult to play sports during their adolescence with an interpreter because the interpreter was not able to be on the field with the deaf players and they had to run on to the field anytime there was a break or when strategy was being discussed. Another interviewee mentioned that a current barrier to them participating in physical activity is that they recently had a surgery. An additional barrier to the

interviewees' current physical activity is that there is a lack of interpreters available. The interviewee stated that they have requested interpreters previously for classes and they have not shown up.

Student Data (Cronbach)

Twelve students took the survey anonymously; however, ten out of the 12 did not fit the target group. The main reasons that the survey participants did not meet the target group were either based on age or hearing status. Since there as only two survey responses that went all of the way through, the Cronbach was not able to be calculated.

DISCUSSION

The purpose of this study was to create, adapt, and validate a survey that retrospectively assesses how both parental hearing status and the number of barriers experienced by a deaf individual affect their level of activity while in college. Five experts reviewed and scored both the relevance and clarity of each question of the original survey, and from there the appropriate edits were made. Based on the scoring and suggestions of the experts, no questions were removed or added, but eight were revised for clarity and ease of interpretation. Further evaluation using a $S-CVI_{UA}$ and a $S-CVI_{ave}$ showed excellent content validity of each question and the survey as a whole. The probability of chance agreement for each question indicated that there was a low probability of all of the experts agreeing randomly. The only question that did not receive an evaluation of "Excellent" was the question pertaining to what city and state did an individual grow up in. This question was added to allow for the researcher to see a possible connection between the number of barriers and the population of the area that a deaf individual grew up in. A possible reason that this question was given a lower score from the experts is that the larger aim of the study was not made clear or communicated properly to them.

Overall, the survey scored well but it is not perfect. When it comes to barriers to physical activity, only physical barriers like environmental factors were assessed. There are other barriers to the deaf community that were not assessed like barriers to access to health information to individuals in the deaf community.²³ These barriers can include lack of health knowledge, communication challenges, and marginalization of individuals in the deaf community.²⁴ An additional barrier that was not accessed was the ethnicity of the students who were taking the survey. Individuals of different ethnicities may experience different barriers that are based on their ethnicity or may have a different understanding of the importance of physical activity.^{25,26}

Similar to Zamanzadeh et al., the expert feedback that was received is subjective which means that the expert reviews are subject to bias.¹⁹ This bias was limited as much as possible by having multiple experts review the survey. Other biases like subjective bias were also limited by the use of an anonymous method for the experts to submit their grading and comments. Only five experts were used in this study, which is not a large number when compared to the study done by Zamanzadeh et al. where there were 15 experts and the study done by Roth that had 30 participants.^{19,27} With the typical number of experts involved in the initial review of a survey being between five to seven individuals²⁸, and with similar studies having a larger number of experts, this survey would benefit from having five to seven experts from each field to review the survey. If this study were to be completed again, the number of experts should be increased by five to seven additional experts to ensure that the effects of personal biases are minimal. On top of the number of experts needing to be increased, the method that the experts analyzed the survey should also be revised. In this study, experts reviewed all of the questions within the survey and not just the ones that were relevant to their field. For this study, it would have been more beneficial to have the experts only review the questions that were relevant to their field.

Dong this would minimize confounding variables and the variation in background characteristics between the experts.²⁹ Overall, this leads to higher quality survey questions and the data retrieved from the survey.

The sample size for the students taking the survey was low, there were only 12 individuals who took the survey and only two of them fit the criteria to answer the entire survey. Previous studies have utilized larger sample sizes from the target population when compared to the sample size used in this study. The minimum according to a literature review done by Tsang et al. should be 50 respondents for a ten item survey.³⁰ Based on this number there should have been a little over 150 responders for the survey created in this study. This would have ensured that enough participants fit the criteria to calculate a Cronbach's alpha for this study.

Three individuals participated in the think-aloud interviews for this study. All of the participants identified as male and were spread out throughout the age range for this study. Since there were only participants who identified as male give their responses, the female perspective of the survey was absent. In the deaf community, deaf women have different experiences from deaf men.^{31,32} For example, deaf women experience inequalities in access to health care when compared to deaf men.³¹ This lack of access to health care could be an additional boundary to physical activity that was not assessed in this study. Furthermore, a lack of access to health care means that women could go undiagnosed with various health issues that could lead to a lack of participation in physical activity.

On top of only having male interview participants, having only three participants is not enough to comfortably confirm that the questions within the survey assess the appropriate aspects. In most studies, it is common for the number of interviews to fall between five and 15.³⁴ So, more participants should be interviewed to ensure the content validity of this survey.

One strength of this study is that it utilized expertise from individuals who are experts in either the field of deaf education or physical activity/physical education. As mentioned previously, the method of how the experts analyzed the survey should be changed to allow for a more beneficial analysis. Once this change is made, utilizing individuals from both fields will allow for both main aspects of the survey to be evaluated appropriately. Another strength of this study is that questions from an already validated tool, the IPAQ, were utilized to assess the current physical activity of the participants. A third strength of this study was the utilization of think-aloud interviews to get a deeper understanding of how different individuals received each question. This was also a way to discover if any questions were confusing, offensive, etc. from the target audience's perspective.

One limitation of this study is that expert ratings are subjective, so there is a chance of bias in their rankings, and with only having five experts who participated, the sample size of experts is another limitation. Another limitation would be the number of physical education experts, there was only one expert who was an expert in the field of physical education compared to the four experts in deaf education. A third limitation was the sample size of student participants who took the survey all of the way through, without a sufficient number the Cronbach alpha was not able to be calculated.

CONCLUSION

This survey validation study used a systematic and multiple stage process. This process showed that the created survey will need to be tested again with more experts and a larger number of think-aloud interviews. Without this, there is not enough data to show that the created survey is useful and adequately assesses how both parental hearing status and the number of barriers experienced by a deaf individual affects their level of activity while in college.

REFERENCES

1. CDC Maps America's High Levels of Inactivity. CDC. Published January 1, 2016. Accessed October 21, 2021. <https://www.cdc.gov/media/releases/2020/0116-americas-inactivity.html>
2. Lack of exercise, not diet, linked to rise in obesity, Stanford research shows. News Center. Published July 7, 2014. Accessed October 21, 2021. <https://med.stanford.edu/news/all-news/2014/07/lack-of-exercise--not-diet--linked-to-rise-in-obesity--stanford-.html>
3. Overview. NIMHD. Published 2019. Accessed October 15, 2021. <https://www.nimhd.nih.gov/about/overview/>
4. Barnett S, Cuculick J, Dewindt L, Matthews, Sutter E. National Center for Deaf Health Research, CBPR with deaf communities. In: Wallerstein N, Duran B, Oetzel J, Minkler M eds. *Community-Based Participatory Research for Health, Advancing Social and Health Equity*. San Francisco, CA: Jossey-Bass; 2018:157-174.
5. Centers for Disease Control and Prevention (CDC). [Identifying infants with hearing loss - United States, 1999-2007](#). MMWR Morb Mortal Wkly Rep. 59(8): 220-223. Vohr B. [Overview: infants and children with hearing loss—part I](#). Ment Retard Dev Disabil Res Rev. 2003;9:62–64.
6. Mitchell RE, Karchmer MA. [Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States](#). (PDF) Sign Language Studies. 2004;4(2):138-163.
7. Barnett S, McKee M, Smith SR, Pearson TA. Deaf sign language users, health inequities, and public health: opportunity for social justice. *Prev Chronic Dis*. 2011;8(2):A45.
8. M. Kathleen Ellis, Lauren J. Lieberman, Gail M. Dummer, Parent Influences on Physical Activity Participation and Physical Fitness of Deaf Children, *The Journal of Deaf Studies and Deaf Education*, Volume 19, Issue 2, April 2014, Pages 270–281, <https://doi.org/10.1093/deafed/ent033>
9. Ellis K, Butterfield SA, Lehnhard RA. Grip-strength performances by 6- to 19-yr.-old children with and without hearing impairments. *Percept Mot Skills*. 2000;90(1):279-282. doi:10.2466/pms.2000.90.1.279
10. Dair J, Ellis MK, Lieberman LJ. PREVALENCE OF OVERWEIGHT AMONG DEAF CHILDREN. *Am Ann Deaf*. 2006;151(3):318-26. <https://ezproxy.rit.edu/login?url=https://www-proquest-com.ezproxy.rit.edu/scholarly-journals/prevalence-overweight-among-deaf-children/docview/214481357/se-2?accountid=108>. doi: <http://dx.doi.org.ezproxy.rit.edu/10.1353/aad.2006.0034>.
11. Age Distribution of Undergraduate Students, by Type of Institution | The Hamilton Project. Hamiltonproject.org. Published 2021. Accessed April 28, 2021. https://www.hamiltonproject.org/charts/age_distribution_of_undergraduate_students_by_type_of_institution

12. CDC. Screening and Diagnosis of Hearing Loss. Centers for Disease Control and Prevention. Published September 11, 2020. Accessed April 1, 2021. <https://www.cdc.gov/ncbddd/hearingloss/screening.html>
13. IPAQ scoring protocol - International Physical Activity Questionnaire. IPAQ scoring protocol - International Physical Activity Questionnaire. Google.com. Published 2016. Accessed April 28, 2021. <https://sites.google.com/site/theipaq/scoring-protocol>
14. International Physical Activity Questionnaire – Long Form. Shirley Ryan AbilityLab. Published September 4, 2015. Accessed December 9, 2021. <https://www.sralab.org/rehabilitation-measures/international-physical-activity-questionnaire-long-form>
15. Willis GB, Artino AR. What Do Our Respondents Think We're Asking? Using Cognitive Interviewing to Improve Medical Education Surveys. *Journal of Graduate Medical Education*. 2013;5(3):353-356. doi:10.4300/jgme-d-13-00154.1
16. Adams, W. K., & Wieman, C. E. (2011). Development and validation of instruments to measure learning of expert-like thinking. *International Journal of Science Education*, 33(9), 1289–1312. doi:[10.1080/09500693.2010.512369](https://doi.org/10.1080/09500693.2010.512369)
17. Howlett O, McKinstry C, Lannin NA. Using the cognitive interviewing process to improve survey design by allied health: A qualitative study. *Aust Occup Ther J*. 2018;65(2):126-134. doi:10.1111/1440-1630.12445
18. Singh N, Ponde V, Jagannathan B, Rao PB, Dixit A, Agarwal G. Development and validation of a Questionnaire to study practices and diversities in Plexus and Peripheral nerve blocks. *Indian J Anaesth*. 2021;65(3):197-201. doi:10.4103/ija.IJA_1161_20
19. Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar A-R. Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication. *J Caring Sci*. 2015;4(2):165-178. doi:10.15171/jcs.2015.017
20. Rodrigues, I.B., Adachi, J.D., Beattie, K.A. *et al*. Development and validation of a new tool to measure the facilitators, barriers and preferences to exercise in people with osteoporosis. *BMC Musculoskelet Disord* **18**, 540 (2017). <https://doi.org/10.1186/s12891-017-1914-5>
21. Arat S, Van den Zegel A, Van Rillaer M, et al. Development and preliminary evaluation of the validity and reliability of a revised illness perception questionnaire for healthcare professionals. *BMC Nurs*. 2016;15(1):1-9. doi:10.1186/s12912-016-0156-4
22. Tavakol M, Dennick R. Making sense of Cronbach's alpha. *Int J Med Educ*. 2011;2:53-55. Published 2011 Jun 27. doi:10.5116/ijme.4dfb.8dfd
23. Naseribooriabadi T, Sadoughi F, Sheikhtaheri A. Barriers and Facilitators of Health Literacy among D/deaf Individuals: A Review Article. *Iran J Public Health*. 2017;46(11):1465-1474.
24. Alexa Kuenburg, Paul Fellingner, Johannes Fellingner, Health Care Access Among Deaf People, *The Journal of Deaf Studies and Deaf Education*, Volume 21, Issue 1, January 2016, Pages 1–10, <https://doi.org/10.1093/deafed/env042>

25. Hornbuckle LM. Running while Black: A distinctive safety concern and barrier to exercise in White neighborhoods. *Prev Med Rep.* 2021;22:101378. Published 2021 Apr 20. doi:10.1016/j.pmedr.2021.101378
26. Saint Onge JM, Krueger PM. Education and racial-ethnic differences in types of exercise in the United States. *J Health Soc Behav.* 2011;52(2):197-211. doi:10.1177/0022146510394862
27. Roth M. Validating the use of Internet survey techniques in visual landscape assessment—An empirical study from Germany. *Landscape and Urban Planning.* 2006;78(3):179-192. doi:10.1016/j.landurbplan.2005.07.005
28. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. *Front Public Health.* 2018;6:149. Published 2018 Jun 11. doi:10.3389/fpubh.2018.00149
29. Olson K. An Examination of Questionnaire Evaluation by Expert Reviewers. *Field Methods.* 2010;22(4):295-318. doi:[10.1177/1525822X10379795](https://doi.org/10.1177/1525822X10379795)
30. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J Anaesth.* 2017;11(Suppl 1):S80-S89. doi:10.4103/sja.SJA_203_17
31. Celebrate Deaf Women: A Discussion About Navigating Barriers and Building Success. National Deaf Center. Published March 22, 2021. Accessed November 21, 2021. <https://www.nationaldeafcenter.org/news/celebrate-deaf-women-discussion-about-navigating-barriers-and-building-success>
32. Stauffer LK, Long G. A comparison of sex-role attitudes of hearing and deaf young men and women. *J Am Deaf Rehabil Assoc.* 1990;24(1):7-11. <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1997-71229-001&site=ehost-live&scope=site>
33. Ubido J, Huntington J, Warburton D. Inequalities in access to healthcare faced by women who are deaf. *Health Soc Care Community.* 2002;10(4):247-253. doi:10.1046/j.1365-2524.2002.00365.x
34. Paul C. Beatty, Gordon B. Willis, Research Synthesis: The Practice of Cognitive Interviewing, *Public Opinion Quarterly*, Volume 71, Issue 2, Summer 2007, Pages 287–311, <https://doi.org/10.1093/poq/nfm006>

Appendix A

Start of Block: Consent Question and Exclusion Questions

Q32 Title of research study:

Access to Physical Activity: Influence of physical activity during adolescence on the activity levels of deaf and hard of hearing college students?

Investigator and Department: Kenly Ciampaglione, Wegmans School of Health and Nutrition, Rochester Institute of

Technology Dr. Zachary Bevilacqua, Wegmans School of Health and Nutrition, Rochester Institute of Technology

Why are we doing this research? There is currently a gap in the literature on how barrier to physical activity during adolescence affects the activity level of deaf and hard of hearing individuals once they are college aged. These barriers include: lack of interpreting services, inability to communicate with other participants, transportation barriers, local crime levels, pollution, and financial barriers. Therefore, the aim of this study is to gather data regarding access to physical activity during adolescence and the current activity level of deaf and hard of hearing individuals on the Rochester Institute of Technology campus.

Why are you being invited to take part in this research study?

We have invited you to take part in this survey study because you are a student at the Rochester Institute of Technology.

Who can I talk to?

If you have questions, concerns, or complaints, contact Dr. Zachary Bevilacqua, Wegmans School of Health and Nutrition, Rochester Institute of Technology, zwbihst@rit.edu.

This research has been reviewed and approved by an Institutional Review Board (Protocol #XXXXXXX). You may talk to them at (585) 475-7673 or e-mail them at: hmfsrs@rit.edu for any of the following: Your questions, concerns, or complaints are not being answered by the research team.

- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.

- You want to get information or provide input about this research.

How long does this survey last? It takes approximately 5 minutes, and asks simple questions about demographics, past access to physical activity, and current activity level.

What are my responsibilities if I take part in this research

There will be no responsibility regarding participation as this is **voluntary**, but if you wish to participate in this study, we would appreciate if you answer all survey questions accurately.

What happens if I say no, I do not want to be in this research?

If you decide not to take part in the research, there will be no penalty.

What happens if I say yes, but I change my mind later?

If you agree to take the survey but change your mind, there will be no penalty.

What happens to the information we collect? The survey uses an anonymous link, which means your email address and name are not linked to your responses. All information you provide will help create hypotheses on how different levels of access to physical activity can lead to different activity levels in college age students. All data will be kept on the Qualtrics server, and data will only be reported in terms of group differences.

Consent Do you consent to completing this questionnaire?

- Yes, I consent
- I do not consent

Skip To: End of Survey If Do you consent to completing this questionnaire? = I do not consent

Q31 What is your age?

▼ 17 (1) ... 26 (10)

Skip To: End of Survey If What is your age? = 17

Skip To: End of Survey If What is your age? = 26

Q32 What is your sex?

- Male (1)
 - Female (2)
 - Non-binary / third gender (3)
 - Prefer not to say (4)
-

Q33 What is your height, in inches?

Q34 What is your weight, in pounds?

Q1 Are you a Deaf or Hard of Hearing individual?

- Yes (1)
- No (2)

Skip To: End of Survey If Are you a Deaf or Hard of Hearing individual? = No

Q2 Were you diagnosed as deaf or Hard of hearing after the age of 3?

Yes (1)

No (2)

Skip To: End of Survey If Were you diagnosed as deaf or Hard of hearing after the age of 3? = Yes

Q3 What city and state did you live in during your adolescence?

Q4 What is the hearing status of your parents?

Deaf (1)

Hard-of-hearing (2)

Hearing (3)

One hearing parent, and one deaf or hard of hearing parent (4)

Q5 During your adolescence, were your parents physically active?

Yes (1)

No (2)

Q6 During your adolescence, did your parents encourage you to play sports?

Yes (1)

No (2)

Q7 During your adolescence, did you participate in physical activities?

Yes (1)

No (2)

Skip To: Q30 If During your adolescence, did you participate in physical activities? = No

Q8 Select all of the following activities that you participated in during adolescence:

School sport team (1)

Travel sports team (2)

Dance groups (3)

Individual exercise (like swimming, walking, running, weightlifting, etc.) (4)

Q29 Did you need interpreting services during these fitness activities?

Yes (1)

No (2)

Skip To: Q10 If Did you need interpreting services during these fitness activities? = No

Q9 Did you have interpreting services available during these fitness activities?

Yes (1)

No (2)

Skip To: End of Block If Did you have interpreting services available during these fitness activities? = Yes

Q10 How did you communicate with the other participants?

They were deaf/hoh and used American Sign Language (1)

They were Hearing and used American Sign Language (2)

Lip reading/speaking (3)

Other (4) _____

Display This Question:

If During your adolescence, did you participate in physical activities? = No

Q30 Select all of the following that were barriers to physical activity for you:

Crime or fear for your personal safety (1)

Pollution (2)

Lack of interpreting services (3)

Lack of money (4)

I had no barriers (5)

Other (6) _____

End of Block: Consent Question and Exclusion Questions

Start of Block: IPAQ-Short (Current Physical Activity levels)

Q15

During the last 7 days, how much time did you spend sitting? (in minutes).

Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

Q16

During the last 7 days, on how many days did you walk for **at least 10 minutes at a time?**

Include time at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

0 1 2 4 5 6 7

Days of walking ()	
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Skip To: Q18 If During the last 7 days, on how many days did you walk for at least 10 minutes at a time? Includ... [Days of walking] =

Q17

On average, how many minutes of walking did you perform on the days you were active?

Q18

During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities.

Think only about those physical activities that you did for at least 10 minutes at a time.
Do not include walking.

0 1 2 4 5 6 7

Days of moderate physical activity ()	
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Skip To: Q20 If During the last 7 days, on how many days did you do moderate physical activities like gardening,... [Days of moderate physical activity] =

Q19 On average, how many minutes of moderate physical activity did you perform on the days you were active?

Q20

During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling?

Think only about those physical activities that you did for at least 10 minutes at a time.

0 1 2 4 5 6 7

Days of vigorous physical activity ()	
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Skip To: End of Block If During the last 7 days, on how many days did you do vigorous physical activities like heavy lifti... [Days of vigorous physical activity] =

Q21

On average, how many minutes of vigorous physical activity did you perform on the days you were active?

End of Block: IPAQ-Short (Current Physical Activity levels)

Start of Block: RIT

Q33 What types of organized fitness do you **currently** participate in? Select all that apply.

- RIT NCAA sports team (1)
- RIT intramural sports team (2)
- RIT club sports team (3)
- Fitness classes at the Student Life Center (4)
- Other (6) _____
- None (7)

Skip To: End of Survey If What types of organized fitness do you currently participate in? Select all that apply. = None

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = RIT NCAA sports team

Q34 When are interpreting services available to you during NCAA sport participation? Select all that apply.

- Weight training sessions (1)
- Games (2) Practices (3) Locker room (4) Other (5)
- _____ Interpreting services are not available (6) I have not inquired about interpreting services (7)

Display This Question:

If When are interpreting services available to you during NCAA sport participation? Select all that... =

Weight training sessions

Or When are interpreting services available to you during NCAA sport participation? Select all that...

= Games

Or When are interpreting services available to you during NCAA sport participation? Select all that...

= Practices

Or When are interpreting services available to you during NCAA sport participation? Select all that... = Locker room

Q35 Do you have to request interpreting services for each game/practice/etc.?

- Yes (1)

No (2)

End of Block: RIT

Start of Block: RIT SLC classes

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = Fitness classes at the Student Life Center

Q38 Are interpreting services available to you during fitness classes?

- Yes (1) No (3) I have not inquired about interpreting services (4)

Display This Question:

If Are interpreting services available to you during fitness classes? = Yes

Q45 Do you have to request interpreting services for each class?

- Yes (4)

- No (5)

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = RIT club sports team

Q43 When are interpreting services available to you during club sports? Select all that apply.

- Weight training sessions (1)

- Games (2)

- Practices (3)

- Locker room (4)

- Other (5)

Interpreting services are not available (6)

I have not inquired about interpreting services (7)

Display This Question:

*If When are interpreting services available to you during club sports? Select all that apply. =
Weight training sessions*

*Or When are interpreting services available to you during club sports? Select all that apply. =
Games*

*Or When are interpreting services available to you during club sports? Select all that apply.
=
Practices*

*Or When are interpreting services available to you during club sports? Select all that apply.
= Locker room*

Q46 Do you have to request interpreting services for each game/practice/etc.? Yes
(4)

No (5)

Display This Question:

*If What types of organized fitness do you currently participate in? Select all that apply. =
RIT intramural sports team*

Q44 When are interpreting services available to you during intramural sports? Select all that
apply.

Games (1) Interpreting services are not available (2) I have not inquired about
interpreting services (3)

Display This Question:

If When are interpreting services available to you during intramural sports? Select all that apply. =

Games

Q47 Do you have to request interpreting services for each intramural game?

Yes (1)

No (2)

End of Block: RIT SLC classes

Appendix B

Hello,

My name is Kenly Ciampaglione, I am a Graduate Student completing my Masters of Science in Health and Well-being Management here at the Rochester Institute of Technology. You are receiving this email because you are being invited to participate in a study that is being done through the Wegmans School of Health and Nutrition. Currently, little is known on how access to physical activity during adolescence will influence the current physical activity levels of deaf and hard-of-hearing students. Therefore, we are surveying deaf and hard-of-hearing individuals at RIT as a method to determine this relationship.

On top of taking the survey, there is a separate 1 on 1 interview component, which should not take longer than 30 minutes. If you would like to participate please reach out to me via email at kxc8523@rit.edu.

We greatly appreciate your participation. As such, all participants will receive a \$30 amazon gift card as a thank you for volunteering their time.

This study has been approved by the Rochester Institute of Technology Institutional Review Board, protocol #01061121.

Thank you for your time,

Kenly Ciampaglione

Appendix C

Grading Sheet

Relevance

- 1 = not relevant
- 2 = item needs some revision
- 3 = relevant but needs minor revision
- 4 = very relevant

Clarity

- 1 = not clear
- 2 = item needs some revision
- 3 = clear but needs minor revisions
- 4 = very clear

If a score of 2 or 3 is given please write a suggestion on how to change the question or the choices

Question	Relevance	Clarity	Comments
1			
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Appendix D

Start of Block: Consent Question and Exclusion Questions

Consent Reading **Title of research study:**

Access to Physical Activity: Influence of physical activity during adolescence on the activity levels of deaf and hard of hearing college students? . **Investigator and Department:** Kenly Ciampaglione, Wegmans School of Health and Nutrition, Rochester Institute of

Technology Dr. Zachary Bevilacqua, Wegmans School of Health and Nutrition, Rochester Institute of Technology

Why are we doing this research? There is currently a gap in the literature on how barrier to physical activity during adolescence affects the activity level of deaf and hard of hearing individuals once they are college aged. These barriers include: lack of interpreting services, inability to communicate with other participants, transportation barriers, local crime levels, pollution, and financial barriers. Therefore, the aim of this study is to gather data regarding access to physical activity during adolescence and the current activity level of deaf and hard of hearing individuals on the Rochester Institute of Technology campus.

Why are you being invited to take part in this research study?

We have invited you to take part in this survey study because you are a student at the Rochester Institute of Technology.

Who can I talk to?

If you have questions, concerns, or complaints, contact Dr. Zachary Bevilacqua, Wegmans School of Health and Nutrition, Rochester Institute of Technology, zwbihst@rit.edu.

This research has been reviewed and approved by an Institutional Review Board (Protocol #XXXXXXXX). You may talk to them at (585) 475-7673 or e-mail them at: hmfsrs@rit.edu for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.

- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.

· You want to get information or provide input about this research. **How long does this survey last?** It takes approximately 5 minutes, and asks simple questions about demographics, past access to physical activity, and current activity level.

What are my responsibilities if I take part in this research

There will be no responsibility regarding participation as this is **voluntary**, but if you wish to participate in this study, we would appreciate if you answer all survey questions accurately.

What happens if I say no, I do not want to be in this research?

If you decide not to take part in the research there will be no penalty.

What happens if I say yes, but I change my mind later?

If you agree to take the survey but change your mind, there will be no penalty.

What happens to the information we collect? The survey uses an anonymous link, which means your email address and name are not linked to your responses. All information you provide will help create hypotheses on how different levels of access to physical activity can lead to different activity levels in college age students. All data will be kept on the Qualtrics server, and data will only be reported in terms of group differences.

Consent Do you consent to completing this questionnaire?

- Yes, I consent (6)
- I do not consent (7)

Skip To: End of Survey If Do you consent to completing this questionnaire? = I do not consent

1 What is your age?

▼ 17 (1) ... 26 (10)

Skip To: End of Survey If What is your age? = 17

Skip To: End of Survey If What is your age? = 26

2 What sex do you identify with?

- Male (1)
 - Female (2)
 - Prefer not to say (4)
-

3 What is your height? (feet and inches)

4 What is your estimated weight? (in pounds)

5 Are you a Deaf or Hard of Hearing individual?

- Yes (1)
- No (2)

Skip To: End of Survey If Are you a Deaf or Hard of Hearing individual? = No

6 Was it identified that you were deaf or Hard of hearing after the age of 3?

- Yes (1)

No (2)

Skip To: End of Survey If Was it identified that you were deaf or Hard of hearing after the age of 3? = Yes

7 What city and state did you live in during your adolescence?

8 What is the hearing status of your parents?

- Deaf (1)
 - Hard-of-hearing (2)
 - Hearing (3)
 - One hearing parent, and one deaf or hard of hearing parent (4)
-

9 During your adolescence, were your parents physically active?

Yes (1)

No (2)

10 During your adolescence, did your parents encourage you to play sports? (i.e. soccer, football, lacrosse, hockey, etc.)

Yes (1)

No (2)

11 During your adolescence, did you participate in physical activities? (i.e. running, dancing, jump rope, etc.) Yes (1)

No (2)

Skip To: 16 If During your adolescence, did you participate in physical activities? (i.e. running, dancing, jump... = No

12 Select all of the following activities that you participated in during adolescence:

School sport team (1)

Travel sports team (2)

Dance groups (3)

Individual exercise (like swimming, walking, running, weightlifting, etc.) (4)

13 Did you need an interpreter present to participate in these fitness activities?

Yes (1)

No (2)

Skip To: 15 If Did you need an interpreter present to participate in these fitness activities? = No

14 Did you have interpreting services available during these fitness activities?

Yes (1)

No (2)

Skip To: End of Block If Did you have interpreting services available during these fitness activities? = Yes

15 How did you communicate with the other participants?

- They were deaf/hoh and used American Sign Language (1)
- They were Hearing and used American Sign Language (2)
- Lip reading/speaking (3)
- Other (4) _____

Display This Question:

If During your adolescence, did you participate in physical activities? (i.e. running, dancing, jump... =

No

16 Select all of the following that were barriers to physical activity for you:

- Crime or fear for your personal safety (1)
- Pollution (2)
- Lack of interpreting services (3)
- Lack of money (4)
- I had no barriers (5)
- Lack of time (7)
- Lack of motivation (8)
- I did not enjoy exercise (9)
- Fear of injury (10)
- Lack of individuals to participate with (11)
- Lack of transportation (12)

- Lack of incentives (13)
- Lack of confidence in ability to be good at the activity (14)
- Lack of support (15)
- Lack of locations to be physically active (like parks or sports fields) (16)
- Other (17) _____

End of Block: Consent Question and Exclusion Questions

Start of Block: IPAQ-Short (Current Physical Activity levels)

17

During the last 7 days, how much time did you spend sitting? (in minutes).

Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

18

During the last 7 days, on how many days did you walk for **at least 10 minutes at a time?**

Include time at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

0 1 2 3 4 5 6 7

Days of walking ()	
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Skip To: 20 If During the last 7 days, on how many days did you walk for at least 10 minutes at a time? Includ... [Days of walking] =

19

On average, how many minutes of walking did you perform on the days you were active?

20

During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities.

Think only about those physical activities that you did for at least 10 minutes at a time.
Do not include walking.

0 1 2 3 4 5 6 7

Days of moderate physical activity ()



Skip To: 22 If During the last 7 days, on how many days did you do moderate physical activities like gardening,... [Days of moderate physical activity] =

21 On average, how many minutes of moderate physical activity did you perform on the days you were active?

22

During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling?

Think only about those physical activities that you did for at least 10 minutes at a time.

0 1 2 3 4 5 6 7

Days of vigorous physical activity ()	
--	--

Skip To: End of Block If During the last 7 days, on how many days did you do vigorous physical activities like heavy lifti... [Days of vigorous physical activity] =

23

On average, how many minutes of vigorous physical activity did you perform on the days you were active?

End of Block: IPAQ-Short (Current Physical Activity levels)

Start of Block: RIT

24 What types of organized fitness do you **currently** participate in? Select all that apply.

- RIT NCAA sports team (1)
- RIT intramural sports team (2)
- RIT club sports team (3)

- Fitness classes at the Student Life Center (4)
- Other (6) _____
- None (7)

Skip To: End of Survey If What types of organized fitness do you currently participate in? Select all that apply. = None

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = RIT NCAA sports team

25 When are interpreting services available to you during NCAA sport participation?
Select all that apply.

- Weight training sessions (1)
- Games (2)
- Practices (3)
- Locker room (4)
- Other (5) _____
- Interpreting services are not available (6)
- I have not inquired about interpreting services (7)

Display This Question:

If When are interpreting services available to you during NCAA sport participation? Select all that... =

Weight training sessions

Or When are interpreting services available to you during NCAA sport participation? Select all that...

= Games

Or When are interpreting services available to you during NCAA sport participation? Select all that...

= Practices

Or When are interpreting services available to you during NCAA sport participation? Select all that... = Locker room

26 Do you have to request interpreting services for each game/practice/etc.?

- Yes (1)
- No (2)

End of Block: RIT

Start of Block: RIT SLC classes

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = Fitness classes at the Student Life Center

27 Are interpreting services available to you during fitness classes?

- Yes (1)
- No (3)
- I have not inquired about interpreting services (4)

Display This Question:

If Are interpreting services available to you during fitness classes? = Yes

28 Do you have to request interpreting services for each class?

Yes (4)

No (5)

Display This Question:

If What types of organized fitness do you currently participate in? Select all that apply. = RIT club sports team

29 When are interpreting services available to you during club sports? Select all that apply.

Weight training sessions (1)

Games (2)

Practices (3)

Locker room (4)

Other (5)

Interpreting services are not available (6)

I have not inquired about interpreting services (7)

Display This Question:

If When are interpreting services available to you during club sports? Select all that apply. = Weight training sessions

Or When are interpreting services available to you during club sports? Select all that apply. = Games

Or When are interpreting services available to you during club sports? Select all that apply. = Practices

*Or When are interpreting services available to you during club sports? Select all that apply.
= Locker room*

30 Do you have to request interpreting services for each game/practice/etc.?

Yes (4)

No (5)

Display This Question:

*If What types of organized fitness do you currently participate in? Select all that apply. =
RIT intramural sports team*

31 When are interpreting services available to you during intramural sports? Select all that apply.

Games (1)

Interpreting services are not available (2)

I have not inquired about interpreting services (3)

Display This Question:

*If When are interpreting services available to you during intramural sports? Select all that
apply. =
Games*

32 Do you have to request interpreting services for each intramural game?

Yes (1)

No (2)

End of Block: RIT SLC classes
