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MICHIGAN FITNESS FOUNDATION
LINKING LESSONS FOR
PEOPLE WITH INTELLECTUAL DISABILITIES
EVALUATION REPORT

This work represents formative work in developing and testing programs designed to meet the needs of people with intellectual disabilities. The program name has evolved from linking lessons to taste move learn with considerations for equity.

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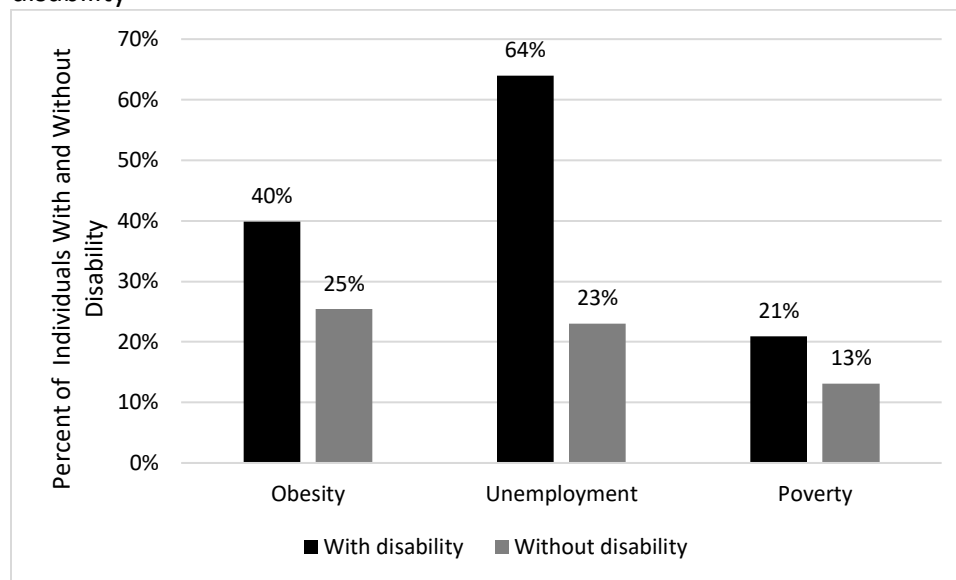
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Introduction

The Centers for Disease Control and Prevention define intellectual disability (ID) as the state when “there are limits to a person’s ability to learn at an expected level and function in daily life” (Centers for Disease Control and Prevention, 2019). In the United States, approximately 16 million people live with ID (Center for Disease Control, 2011). Living with any disability is linked with various health and socioeconomic outcomes, such as obesity, unemployment, poverty, and reduced earnings (Kraus, Lauer, Coleman, & Houtenville, 2018). Compared to people living without a disability, those living with a disability have higher rates of obesity, unemployment, and poverty (Kraus et al., 2018).

Figure 1. Obesity, unemployment and poverty among individuals living with and without disability



The Supplemental Nutrition Assistance Program – Education (SNAP-Ed) is a federally funded program that provides comprehensive nutrition and physical activity interventions tailored for vulnerable populations (individuals and families who are at or below 185% of the federal poverty level) across the United States (United States Department of Agriculture, 2019). Since SNAP-Ed eligibility is predicated on having earnings close to the federal poverty level and the poverty rate among people living with a disability is high, many individuals living with a disability are likely to be eligible for SNAP-Ed.

People living with ID can face barriers to healthy nutrition and physical activity that are related to their ID. Barriers to healthy nutrition include the absence of healthy food choices, medications that affect appetite and contribute to weight gain, oral motor problems, dysphagia, food aversions, and poor eating habits (American Association on Health and Disability, 2011; Ptomey & Wittenbrook, 2015). Factors that impede getting adequate physical activity include physical limitations, pain, lack of energy, insufficient access to accessible environments (e.g., sidewalks, parks, exercise equipment), and lack of social and financial support (e.g., transportation or gym costs) that facilitate physical activity (American Association on Health and Disability, 2011). While these barriers to healthy nutrition and physical activity

are not unique to people living with ID, they may be exacerbated by the presence of ID. To address these barriers to healthy nutrition and physical activity, people living with ID require customized programs that address their needs.

The United States Department of Agriculture (USDA) provides a variety of evidence-based nutrition education programs (United States Department of Agriculture, 2020a). Further, a recent study conducted by the USDA indicated that SNAP-Ed nutrition education programs are effective in increasing healthy food choices (Valerie et al., 2013). However, there is limited availability of nutrition education programs designed for people living with ID, necessitating the creation of nutrition education programs that account for the combination of needs and abilities of people living with ID.

A review of the SNAP-Ed Toolkit revealed one SNAP-Ed intervention tailored to serve individuals living with disabilities, but it is designed specifically for people living with physical disabilities and impairments (United States Department of Agriculture, 2020a). Walk with Ease is a direct education intervention designed to provide education about successful physical activity for individuals living with physical or mobility impairments (United States Department of Agriculture, 2020c). While some people living with ID also have physical impairments, Walk with Ease does not provide guidance related to the unique needs of people living with ID.

Thus, it is important to examine the efficacy of nutrition education programs for people living with ID and assess whether adjustments are required to best meet the needs of members of this community. Toward this end, the Michigan Fitness Foundation (MFF) created *Linking Lessons™: People with Intellectual Disabilities (LL:PID)*.

LL:PID is a group-based, behavior-focused direct education program focused on nutrition education and physical activity. Specifically, *LL:PID* is comprised of short, interactive lessons based on attractive posters that convey a healthy eating message.

The MFF conducted this evaluation to assess the potential of the *LL:PID* program as an emerging intervention as defined by SNAP-Ed (United States Department of Agriculture, 2020b). Specifically, this evaluation was designed to examine *LL:PID*'s strengths, efficacy, and appropriateness for individuals living with ID, and potential areas for improvement.

Methods

The current evaluation focused on *LL:PID* intervention fidelity and preliminary outcome surveys to inform intervention modifications to improve program effectiveness.

Participants and Settings

LL:PID was implemented to serve 319 individuals living with ID who were aged 12 years and older. *LL:PID* took place at transition centers ($n=11$), schools ($n=9$), community centers ($n=2$), and non-profit organizations with training and rehabilitation programs for people who have disabilities ($n=2$) from May 2019 through January 2020. Three organizations took part in implementing *LL:PID*: Grand Rapids YMCA (YMCA), the National Kidney Foundation of Michigan (NKFM), and the Henry Ford Health Systems (HFHS). The intervention was implemented 22 times across these three organizations.

The current report presents findings from only the 159 participants who provided both pre-*LL:PID* and post-*LL:PID* survey responses.

Intervention

LL:PID is comprised of short (average length of 36.3 minutes) interactive nutrition lessons for adolescents and adults living with ID. Each lesson includes a physical activity (PA) demonstration and a healthy food tasting based on the featured food. Basic information encourages participants to eat more fruits and vegetables, choose healthy drinks and snacks, moderate portion size, and be more physically active. Instruction ends with a challenge to complete Healthy Homework related to the lesson theme, before the next visit. Ideally, site staff (teachers, caregivers) also participate so they can reinforce the simple messages and apply the healthy eating suggestions to foods offered at the site. *LL:PID* is comprised of five topics with two lessons each (Parts A and B). At least four of the five topics (8 lessons) should be taught. The five topics are the following: (1) MyPlate, (2) Healthy Snacks, (3) Healthy Drinks, (4) Veggies and Fruits, and (5) How Much to Eat. Lessons are required to be at least 20 minutes in length and to include a tasting.

Data Sources

Outcome Survey: That's Me: My Choices

To measure self-reported food preferences and behavioral outcomes related to nutrition, an abbreviated seven-item version of the That's Me: My Choices survey was completed by participants during the first or second intervention lesson (pre-*LL:PID*) and after the last intervention lesson (post-*LL:PID*) of the *LL:PID* program (as opposed to completing a retrospective pre-test at the same time as the post-test at the end of the intervention). Analysis of survey data included only 159 individuals who completed both the pre-*LL:PID* and post-*LL:PID* surveys.

The version of the That's Me: My Choices survey that was used in this evaluation is comprised of seven items to assess nutrition behaviors and food preferences (i.e., "I eat healthy foods," "I eat many different kinds of foods," "I choose water and other healthy drinks," "I eat fruit," "I like vegetables," "I like fruit," and "I eat vegetables"). Participants reported the frequency with which they engaged in the behavior or had the preference using a three-point Likert scale with responses of "a little or none of the time," "sometimes," and "most or all of the time." The nutrition behavior and food preference items on the That's Me: My Choices survey were designed to measure healthy eating as a medium-term (MT1) individual-level indicator from the SNAP-Ed Evaluation Framework for fruits, vegetables, and water (United States Department of Agriculture, 2020a).

Educator Logs

To measure intervention fidelity and gather feedback on intervention implementation, educators completed hand-written educator logs. The logs asked educators to record information about intervention implementation, including number of participants, lesson length (in minutes), talking points completed, tastings completed, healthy homework assigned, feedback, and modifications. For analysis, educator logs were scanned, and the data were entered into an electronic database.

Process Evaluation Call Notes

To gather additional information on intervention implementation, process evaluation calls were conducted with program educators from all three participating organizations midway through implementation ($n=4$) and following completion of the *LL:PID* intervention ($n=5$). Group discussion was facilitated by the Public Health Institute to ensure educator anonymity. Guided discussions addressed the following questions: (1) aspects of *LL:PID* that worked well, (2) strategies that contributed to successful implementation of *LL:PID*, (3) the greatest success implementing *LL:PID*, (4) aspects of *LL:PID* that could have been improved, (5) requested additional training or resources, (6) suggested modifications for *LL:PID*, (7) feedback about the evaluation component of *LL:PID*, (8) whether educators would recommend *LL:PID*, and (9) general feedback and/or comments (Appendix B).

Statistical Analysis

Descriptive analyses were conducted on the quantitative data from the That's Me: My Choices outcome survey and educator logs. To assess self-reported behavioral change after participation *LL:PID*, pre-*LL:PID* and post-*LL:PID* That's Me: My Choices survey data were analyzed using the Wilcoxon signed-rank tests. Separate analyses were conducted on each of the seven That's Me: My Choices survey items. To account for this, Bonferroni adjusted criterion of $p < .007$ was set for statistical significance. All analyses were conducted using SAS version 9.4 (SAS Institute Inc., 2016). For open-ended educator log questions, themes were summarized and compared.

IRB

The data analysis activities described in the current report were determined to be exempt from full review by Western Michigan University's Institutional Review Board (IRB).

Results

Demographics

A total of 159 participants provided both pre-*LL:PID* and post-*LL:PID* responses. *LL:PID* was conducted at three locations: the YMCA, the NKFM, and the HFHS. The majority of participants took part in *LL:PID* at the YMCA ($n=133$, 83.7%), followed by NKFM ($n=14$, 8.8%), and HFHS ($n=12$, 7.6%). Of the 159 participants, 95 (59.7%) were male and 64 (40.3%) were female. See Table 1 for the locations where *LL:PID* was conducted and participant sex.

Table 1. Participant Demographics by Organization (N=159)

Sex	Overall (N= 159)		Organization					
			YMCA ($n=133$)		NKFM ($n= 14$)		HFHS ($n=12$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Male	95	59.7	76	57.1	10	71.4	9	75.0
Female	64	40.3	57	42.9	4	28.6	3	25.0

Note. YMCA = Grand Rapids YMCA; NKFM= the National Kidney Foundation of Michigan, and HFHS = the Henry Ford Health Systems.

Of the 159 participants who provided both pre-LL:PID and post-LL:PID survey responses, 152 participants reported their age, which they did by selecting from a list of age category options. If participants were between 12 years and 20 years of age, they could select their exact age from the list of options. If participants were 21 years old or older, they could select the option “21 or older.” Of the 152 participants who reported their age, 62 (40.8%) were under 18 years old and 90 (59.2%) were 18 years old or older (Table 2).

Table 2. Respondent age at pre survey (N=152)

Age (years)	Overall		Organization		
	<i>n</i>	%	YMCA (<i>n</i> =127)	NKFM (<i>n</i> =14)	HFHS (<i>n</i> =11)
12	5	3.3	5	--	--
13	--	--	--	--	--
14	3	2.0	1	--	2
15	6	4.0	4	--	2
16	11	7.2	7	--	4
17	37	24.3	36	--	1
18	24	15.8	24	--	--
19	8	5.3	8	--	--
20	9	5.9	9	--	--
21 and older	49	32.2	33	14	2
Total	152	100.0	127	14	11

Note. YMCA = Grand Rapids YMCA; NKFM= the National Kidney Foundation of Michigan, and HFHS = the Henry Ford Health Systems.

Participant Outcomes

The seven That’s Me: My Choices survey items and the frequency with which the various answer options were selected are presented in Table 3.

Table 3. Change in frequency from pre-LL:PID to post-LL:PID for all respondents

Survey Question	Pre-LL:PID		Post-LL:PID		Percent Difference ^a
	<i>n</i>	%	<i>n</i>	%	
I eat healthy foods. (<i>n</i> =159)					
Most or all of the time	13	8.2	9	5.7	-2.5
Sometimes	81	50.9	70	44.0	-6.9
A little or none of the time	65	40.9	80	50.3	9.4
I eat many different kinds of food. (<i>n</i> =159)					
Most or all of the time	22	13.8	24	15.1	1.3
Sometimes	68	42.8	63	39.6	-3.2
A little or none of the time	69	43.4	72	45.3	1.9
I choose water and other healthy drinks. (<i>n</i> =157)					
Most or all of the time	16	10.2	11	7.0	-3.2
Sometimes	55	35.0	48	30.6	-4.4
A little or none of the time	86	54.8	98	62.4	7.6
I eat fruit. (<i>n</i> =159)					
Most or all of the time	23	14.5	23	14.5	0.0
Sometimes	53	33.3	50	31.4	-1.9
A little or none of the time	83	52.2	86	54.1	1.9
I like vegetables. (<i>n</i> =157)					
Most or all of the time	27	17.2	27	17.2	0.0
Sometimes	56	35.7	66	42.0	6.4
A little or none of the time	74	47.1	64	40.8	-6.4
I like fruit. (<i>n</i> =157)					
Most or all of the time	23	14.7	12	7.6	-7.0
Sometimes	39	24.8	38	24.2	-0.6
A little or none of the time	95	60.5	107	68.2	7.6
I eat vegetables. (<i>n</i> =155)					
Most or all of the time	25	16.1	19	12.2	-3.9
Sometimes	68	43.9	68	43.9	0
A little or none of the time	62	40.0	68	43.9	3.9

^aPercent difference was calculated by subtracting pre-LL:PID percentage from post-LL:PID percentage.

To examine whether there were changes from pre-LL:PID to post-LL:PID in participants' responses to the seven That's Me: My Choices survey items, Wilcoxon signed rank tests were conducted. Results indicated that there were no significant differences in pre-LL:PID and post-LL:PID on any of the seven That's Me: My Choices survey items (Table 4).

Table 4. Significance of change from pre-LL:PID to post-LL:PID for all respondents

Survey Question	Change from Before Nutrition Lessons (pre) to After (post) ^a	
	Mean Change ^b	<i>p</i> -value ^c
I eat healthy foods. (n=159)	-0.119	0.039
I eat many different kinds of food. (n=159)	-0.006	0.956
I choose water and other healthy drinks. (n=157)	-0.108	0.100
I eat fruit. (n=159)	-0.019	0.823
I like vegetables. (n=157)	0.064	0.322
I like fruit. (n=157)	-0.146	0.042
I eat vegetables. (n=155)	-0.077	0.265

^a Wilcoxon signed rank test.

^b Mean change was calculated by subtracting pre-LL:PID mean from post-LL:PID mean.

^c Bonferroni adjusted *p*-value is 0.007 for 7 comparisons.

Responses on the seven items from the pre-LL:PID That's Me: My Choices survey were used to determine whether there were improvements among those participants who showed room for improvement at the time of pre-LL:PID. Participants who initially responded with "sometimes" or "a little or none of the time" were considered to have room for improvement and were included in these analyses. Individuals who reported their frequency of healthy eating behaviors and preferences was "most or all of the time" were excluded from these analysis.

For the subset of respondents who showed room for improvement, change was calculated by subtracting pre-LL:PID responses from post-LL:PID. The number of participants who decreased, maintained, and increased their self-reported healthy eating behaviors and preferences from pre- to post-LL:PID can be found in Table 5.

Table 5. Changes in frequency from pre-LL:PID to post-LL:PID for respondents with room for improvement

Survey Question	Respondents with Room for Improvement Change from Pre- to Post-LL:PID					
	Decreased		Maintained		Increased	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
I eat healthy foods. (n=146)	29	19.9	93	63.7	24	16.4
I eat many different kinds of food. (n=137)	24	17.5	74	54.0	39	28.5
I choose water and other healthy drinks. (n=141)	35	24.8	73	51.8	33	23.4
I eat fruit. (n=136)	23	16.9	79	58.1	34	25.0
I like vegetables. (n=130)	15	11.5	79	60.8	36	27.7
I like fruit. (n=134)	19	14.2	93	69.4	22	16.4
I eat vegetables. (n=130)	22	16.9	79	60.8	29	22.3

To examine whether the responses of participants with room for improvement were significantly different from pre-LL:PID to post-LL:PID, Wilcoxon signed rank tests were conducted (Table 6). Results indicated that there were statistically significant changes in scores from pre- to post-LL:PID on two items: “I eat healthy foods” and “I like vegetables.”

Table 6. Significance of change from pre-LL:PID to post-LL:PID for respondents with room for improvement

Survey Question	Respondents with Room for Improvement Change from Before Nutrition Lessons (pre) to After (post) ^a	
	Mean Change ^b	p-value ^c
I eat healthy foods. (n=146)	-0.021	0.7041
I eat many different kinds of food. (n=137)	0.183	0.0066*
I choose water and other healthy drinks. (n=141)	0.007	0.9024
I eat fruit. (n=136)	0.147	0.0223
I like vegetables. (n=130)	0.238	0.0002*
I like fruit. (n=134)	0.075	0.1742
I eat vegetables. (n=130)	0.100	0.1075

^a Wilcoxon signed rank test.

^b Mean change was calculated by subtracting pre-LL:PID mean from post-LL:PID mean.

^c Bonferroni adjusted p-value is 0.007 for 7 comparisons.

*significant at $p < .007$.

Educator Logs

All Lessons

Table 7 depicts the number of series, lessons, and total reach for each of the three organizations that offered LL:PID: YMCA, HFHS, and NKFM. A total of 22 series were reported with 18 taking place at YMCA, 2 at HFHS, and 2 at NKFM.

As part of LL:PID, educators were required to do eight out of ten lessons. Results indicated that all educators did at least eight lessons and educators at HFHS and NKFM did all ten lessons. Results also indicated that the total reach of LL:PID across all three organizations was 316. Further, the results indicated that 309 participants attended most of the lessons. The average number of participants attending most lessons was 14, but there was a wide range for total participants attending most lessons with the lowest estimate reported as 11 participants and the highest as 35 participants. Setting difference may contribute to the varying lesson size reported in educator logs. HFHS provided lessons in classrooms in schools, thus their numbers were high; whereas, the YMCA worked with many different groups, so their range of group size is large.

Table 7. Number of Series, Lessons, and Total Reach by Organization

	Overall	YMCA	HFHS	NKFM
Number of Series (logs submitted)	22	18	2	2
Sites per Organization	12	8	2	2
Average Number of Lessons in Series (10 total)	9.8	9.33	10	10
Minimum Number of Lessons in Series	8	8	10	10
Maximum Number of Lessons in Series	10	10	10	10
Total Reach (unduplicated count)	316	207	70	39
Average Total Reach	14.4	11.1	35.0	19.5
Minimum Total Reach	6	6	32	16
Maximum Total Reach	38	20	38	23
Number of Participants Attending Most Lessons	309	200	70	39
Average Number of Participants Attending Most Lessons	14.0	11.1	35.0	19.5
Minimum Number of Participants Attending Most Lessons	6	6	32	16
Maximum Number of Participants Attending Most Lessons	38	20	38	23

A more nuanced presentation of the settings in which *LL:PID* took place can be found in Table 8. Most lessons took place in transition centers (n=11, 50.0%) and schools (n=9, 40.9%). Fewer organizations reported other settings and no lessons were conducted in adult foster care home settings.

Table 8. Settings by Organization

Setting	Overall (N=22)		YMCA (n=18)		HFHS (n=2)		NKFM (n=2)	
	n	%	n	%	n	%	n	%
Transition Center	11	50.0	9	50.0	--	--	2	100.0
School	9	40.9	7	38.9	2	100.0	--	--
Adult Foster Care Home	--	--	--	--	--	--	--	--
Other	4	18.2	2 ^a	11.1	--	--	2 ^b	100.0

Note. Totals do not add to 100% as respondents were told to select all that apply.

^aOther specified as: Community Center

^bOther specified as: FWOGC and Goodwill Detroit

Fidelity

Requirements were to teach both Parts A and B for four of the five topic areas and for each lesson to be at least 20 minutes and include a tasting. Based on these criteria, only one lesson did not meet the minimum length criteria of 20 minutes (Table 9). The educator commented about this shortened class and explained, “The class came late and also had another commitment, so the class was quite short but still productive. I was able to give them stretch bands, and discuss last week’s topic (cucumbers) while we ate the chickpea salad.” This demonstrates how educators had to work within the confines of site schedules, and during this

pilot only one lesson was unable to meet the required 20 minutes because the participants had another commitment.

Table 9. Intervention Fidelity (N=22)

Organization	Number of Series with Less Than 4 Topic Areas (both A & B)		Number of Lessons Under 20 Minutes		Number of Lessons Without 1 Tasting	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Overall	--	--	1	4.5	--	--
YMCA (<i>n</i> =18)	--	--	1^a	5.6	--	--
HFHS (<i>n</i> =2)	--	--	--	--	--	--
NKFM (<i>n</i> =2)	--	--	--	--	--	--

Quantitative Results by Lesson

Some educator logs did not include attendance or lesson length for all of the lessons that were taught. Thus, Tables 10 and 11 present the count of how many times lessons were taught and the necessary information about attendance and lesson length were provided. For information about how many times lessons were actually taught, please refer to Table 12.

A total of 316 total participants took part in *LL:PID*. *LL:PID* consists of the following five topics, each of which has two lessons: (1) MyPlate, (2) Healthy Snacks, (3) Healthy Drinks, (4) Veggies and Fruits, and (5) How Much to Eat. Thus, *LL:PID* consists of 10 lessons. All of the lessons were attended by at least 248 participants. The most highly attended lessons were MyPlate A, Healthy Snacks A, and Healthy Drinks B, each of which was attended by 295 participants.

Table 10. Attendance by Lesson

Lesson	Attendance			
	<i>Number of Participants Overall (Unduplicated Count)</i>			
	Total	Average	Minimum	Maximum
	316	13.7	3	38
MyPlate A (<i>n</i> =22)	295	13.4	4	38
MyPlate B (<i>n</i> =21)	282	13.4	5	38
Healthy Snacks A (<i>n</i> =21)	295	14.0	6	38
Healthy Snacks B (<i>n</i> =21)	291	13.9	5	38
Healthy Drinks A (<i>n</i> =22)	272	12.4	5	38
Healthy Drinks B (<i>n</i> =22)	295	13.4	5	38
Fruits and Veggies A (<i>n</i> =20)	277	13.9	6	38
Fruits and Veggies B (<i>n</i> =20)	263	13.2	4	38
How Much to Eat A (<i>n</i> =19)	248	13.1	3	38
How Much to Eat B (<i>n</i> =19)	253	13.3	3	38

Note. Attendance was not provided for one MyPlate B lesson.

As part of *LL:PID*, lessons are required to be at least 20 minutes long. As depicted in Table 10, results indicated that the average lesson length was 36.3 minutes and the maximum was 60

minutes long. The minimum lesson length was 10 minutes, which was described in Table 8 (the lesson was shortened due to a site scheduling conflict, which was outside the *LL:PID* educator’s control).

Table 11. Lesson Length

Lesson	Lesson Length (minutes)		
	Average	Minimum	Maximum
Overall	36.3	10	60
MyPlate A (n=22)	37.0	25	60
MyPlate B (n=20)	38.3	30	60
Healthy Snacks A (n=21)	37.4	30	60
Healthy Snacks B (n=21)	36.0	10	60
Healthy Drinks A (n=22)	37.0	30	60
Healthy Drinks B (n=22)	35.9	30	60
Fruits and Veggies A (n=20)	35.8	25	60
Fruits and Veggies B (n=20)	35.5	20	60
How Much to Eat A (n=19)	34.7	20	60
How Much to Eat B (n=19)	36.3	25	60

Note. Lesson length was not provided for two MyPlate B lessons.

Educator logs indicated that *LL:PID* was conducted 22 times so the maximum number of times any lesson could be presented was 22 times. All of 10 *LL:PID* lessons were conducted at least 19 times. Three lessons were conducted 22 times: MyPlate A, Healthy Drinks A, and Healthy Drinks B.

Table 12. Number of times each of the 10 Lessons were taught out of 22 Series

Lesson (N=10)	Times Taught	
	n	%
MyPlate A	22	100.0
MyPlate B	22	100.0
Healthy Snacks A	21	95.5
Healthy Snacks B	21	95.5
Healthy Drinks A	22	100.0
Healthy Drinks B	22	100.0
Fruits and Veggies A	20	90.9
Fruits and Veggies B	20	90.9
How Much to Eat A	19	86.4
How Much to Eat B	19	86.4

Table 13 shows the various components that instructors could use in their lessons and the frequency with which each component was utilized for each lesson. Results indicated that the talking points most frequently used for all lessons were Talking Points 1 and 2. Results also indicated that the use of homework varied considerably between lessons, but that every homework was used at least twice.

Table 13. Components Taught by Lesson

Lesson (N=10)	Front Page										Back Page									
	TP 1		TP 2		TP 3		Ask Anytime Questions		Healthy HW 1		TP 1		TP 2		TP 3		TP 4		Healthy HW 2	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
MyPlate A	22	100.0	20	90.9	--	--	8	36.4	22	100.0	7	31.8	5	22.7	--	--	--	--	2	9.1
MyPlate B	11	50.0	9	40.9	--	--	2	9.1	9	40.9	20	90.9	20	90.9	--	--	--	--	19	86.4
Healthy Snacks A	19	86.4	16	72.7	--	--	8	36.4	19	86.4	8	36.4	8	36.4	--	--	--	--	6	27.3
Healthy Snacks B	11	50.0	8	36.4	--	--	5	22.7	9	40.9	16	72.7	16	72.7	--	--	--	--	15	68.2
Healthy Drinks A	18	81.8	12	54.5	--	--	11	50.0	20	90.9	7	31.8	3	13.6	4	18.2	--	--	5	22.7
Healthy Drinks B	11	50.0	12	54.5	--	--	6	27.3	12	54.5	14	63.6	9	40.9	5	22.7	--	--	14	63.6
How Much to Eat A	17	77.3	12	54.5	5	22.7	--	--	17	77.3	4	18.2	4	18.2	--	--	--	--	4	18.2
How Much to Eat B	10	45.5	9	40.9	2	9.1	--	--	6	27.3	15	68.2	12	54.5	15	68.2	--	--	11	50.0
Fruits and Veggies A	18	81.8	12	54.5	5	22.7	4	18.2	20	90.9	4	18.2	3	13.6	3	13.6	--	--	4	18.2
Fruits and Veggies B	6	27.3	1	4.5	3	13.6	2	9.1	7	31.8	18	81.8	14	63.6	17	77.3	5	22.7	12	54.5

Note. TP= talking points, HW = homework, percentages are out of 22 total series.

Table 14 shows the tastings that were used in each lesson. The results indicated that across lessons, Tasting 1 was most commonly used, followed by Tasting 2 and Tasting 3.

Table 14. Tastings by Lesson

Lesson (N=10)	Tasting 1		Tasting 2		Tasting 3	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
MyPlate A	11	50.0	10	45.5	5	22.7
MyPlate B	19	86.4	--	--	--	--
Healthy Snacks A	8	36.4	9	40.9	--	--
Healthy Snacks B	--	--	1	4.5	12	54.5
Healthy Drinks A	2	9.1	18	81.8	--	--
Healthy Drinks B	17	77.3	--	--	8	36.4
How Much to Eat A	15	68.2	--	--	--	--
How Much to Eat B	1	4.5	1	4.5	3	13.6
Fruits and Veggies A	10	45.5	--	--	--	--
Fruits and Veggies B	5	22.7	7	31.8	--	--

Note. Percentages are out of 22 total series.

Qualitative Results by Lesson

Educators provided their feedback on the content, reception, successes, and difficulties for each lesson and tasting. Educators were also specifically asked to report any modifications they made to the lessons. The comments were reviewed for main themes and the frequency with which the main themes were reported is presented for each topic.

Topic: MyPlate (Featured Food: Spinach; PA Demo: Chair Exercises)

Educator feedback and recommendations for improvements:

1. More time is needed to complete surveys and/or waivers (*n*=3).
2. Identify target audience in terms of intellectual and physical abilities (*n*=16).
 - a. High-functioning participants were bored (*n*=1).
 - b. Low-functioning participants could not complete surveys independently (*n*=1).
 - c. Nonverbal participants could not take part in discussions (*n*=4).
 - d. Many participants do not shop for themselves (*n*=1).
 - e. Tastings were not appropriate for individuals who did not eat solid food/eat with feeding tubes (*n*=5).
 - f. One participant could not read (*n*=1).
3. Participants did not do homework regularly (*n*=3).

Modifications made by educators:

1. Educators discussed with participants that they should try not to make negative comments about food or eating habits, and to try new foods and if participants did not like the food, they did not have to eat it (*n*=2).
2. Educator modified physical activity to fit participants' intellectual and physical abilities (*n*=2).
3. Participants could not understand provided discussion points, so the educator modified the discussion(*n*=4).

Tasting comments:

1. Strawberry Spinach Salad
 - a. Educators recommend having a higher strawberry-to-spinach ratio ($n=2$).
2. Veggie Tortilla Roll-Up
 - a. Educators modified the ingredients.
 - i. Educators used gluten-free tortillas ($n=2$).
 - ii. Educators used dairy-free cheese ($n=1$).
 - b. Educators prepped tasting ingredients or entire roll-ups before class ($n=3$).
 - c. Educator recommended adding ingredients so all parts of MyPlate were included ($n=1$).
 - d. Participants liked the tasting but thought it was bland ($n=1$).

Physical activity comments:

1. Educators had participants use bands while seated in a chair and/or just did arm exercises ($n=2$).
2. Educator modified physical activity to accommodate participant in wheelchair ($n=1$).

Topic: Healthy Snacks (Featured Food: Cucumbers; PA Demo: Circuit Training)

Educator feedback and recommendations for improvements:

1. Identify target audience in terms of ability.
 - a. Nonverbal participants could not take part in discussions ($n=1$).
 - b. Participants could not take part in discussions for other reasons ($n=1$).
 - c. Class was “too abstract” for participants ($n=1$).
2. Educator suggested incorporating music into the activity and trying the activity before eating ($n=1$).
3. Educator recommended increasing poster size as the poster was too small for participants to read ($n=1$).
4. Part B: “Sometimes foods” (foods that are okay to eat; e.g., cookies, candy, cake).
 - a. Educator did not discuss “sometimes” foods ($n=1$).
 - b. Students were distracted by the “sometimes” foods ($n=1$).

Modifications made by educators:

1. Educators needed to adjust content of lessons to accommodate participants’ abilities.
 - a. Educators had participants point out their favorite snack on the poster ($n=3$).
 - b. Showed participants a cutout picture of food and asked participants to identify which MyPlate food group it belonged to ($n=2$).
 - c. Educator described the food that was on the card ($n=1$).

Physical activity comments:

1. Strength bands
 - a. Participants did not understand or were unable to use the strength bands appropriately ($n=2$).
 - b. Strength bands required a lot of modification for participants in wheelchairs ($n=1$).
 - c. Participants could not use strength bands independently, so the educator led breathing exercises instead ($n=1$).

- d. Participants loved the strength bands ($n=1$).
- e. Educator led participants in seated exercises instead of using strength bands($n=1$).

Tasting comments

1. Cucumber Sandwiches
 - a. Participants enjoyed sandwiches ($n=5$).
 - b. Educators recommended using cookie cutout shapes ($n=3$).
2. Cucumber and Chickpea Salad
 - a. Participants liked the salad ($n=4$).
 - b. Participants did not like the salad ($n=1$).
 - c. Students who can only eat soft food had difficulty because it was difficult to mash up this recipe ($n=1$).

Topic: Healthy Drinks (Featured Foods: Water, Melon; PA Demo: Yoga)

Educator feedback and recommendations for improvements:

1. Identify target audience in terms of ability ($n=1$).
 - a. Students regularly did not do homework and sometimes forgot what was done the previous week ($n=1$).
2. Teachers consistently talked over the educator and/or take over conversations with their own questions ($n=2$).

Modifications made by educators:

Physical Activity Comments:

1. Educator researched seated yoga poses so participants in wheelchairs could participate ($n=1$).
2. Yoga worked well for students with higher intellectual functioning ($n=1$).
3. The floor was not clean so only standing poses were done ($n=1$).
4. The partner exercises were not done because of participants' varying abilities ($n=1$).

Tasting comments:

1. Flavored water
 - a. Students enjoyed flavored water ($n=9$).
 - b. Students did not like having things floating in their drinks ($n=2$).
 - c. Educator brought carbonated water for students to try ($n=1$).
2. Melons
 - a. Educators had students try cantaloupe and honeydew in addition to watermelon ($n=2$).
 - b. Educators made slushies out of all melons ($n=2$).
3. Watermelon slushie
 - a. Students liked watermelon slushie ($n=2$).
 - b. Did not make the slushie because they melted too quickly or slushie melted before participants could try it ($n=2$).
 - c. Recipe could be hazardous for participants with a honey allergy ($n=1$).

Homework comments:

1. Healthy homework that included assignments to purchase food were not relevant for many participants because they did not purchase food ($n=1$).

Topic: Veggies & Fruits (Featured Foods: Veggies, Dried Beans; PA Demo: Balloon Volleyball)

Educator feedback and recommendations for improvements:

1. Identify target audience in terms of ability.
 - a. Participants could not understand concept of portion control ($n=2$).
 - b. Portion control was not relevant for many participants because their family members or teachers prepare their food ($n=1$).
 - c. Participants had difficulty completing surveys due to intellectual and/or physical limitations ($n=2$).
 - d. Many students did not purchase or prepare their own food ($n=2$).
 - e. Participants with feeding tubes could not take part in the tastings ($n=1$).
2. Lesson is disconnected.
 - a. Educators did not like that the lesson went from talking about vegetables, then beans, and then trying vegetables ($n=4$).
 - b. Educator did not like that the lesson went from talking about fruits to tasting beans ($n=2$).
3. Educator would have liked a poster, which is especially helpful with nonverbal participants ($n=1$).
4. Educator recommends having something to tie all lessons together since this was the last lesson ($n=1$).

Physical activity comments:

1. Dancing
 - a. Participants enjoyed the chicken dance ($n=1$).
 - b. Educator was not sure if they were supposed to create their own dance or teach the participants the chicken dance ($n=1$).
2. Volleyball
 - a. Educator did not think yoga or volleyball were feasible so breathing exercises were done instead ($n=2$).
 - b. Volleyball with a beachball did not work well ($n=1$).
 - c. Volleyball worked well with balloons ($n=2$).

Tasting comments:

1. Bite-sized Piece of Any Vegetable
 - a. Tasting should include humus or dip ($n=3$).
 - b. Educator brought in humus for students to try with the vegetables ($n=1$).
 - c. Students did not want to try plain pieces of lettuce ($n=1$).
2. Three-Bean Salad
 - a. Participants enjoyed the salad ($n=4$).
3. Mandarin Orange Salad
 - a. Students liked the salad ($n=1$).
 - b. All students requested more mandarin oranges alone ($n=1$).
4. Salsa

- a. Educator recommended adding corn to the salsa ($n=1$).

Topic: How Much to Eat (Featured Foods: Veggies, Dried Beans; PA Demo: Dancing)

Educator feedback and recommendations for improvements:

1. Educator did not like that the lesson covered vegetables and had a vegetable tasting but also had a talking point about beans ($n=1$).

Physical activity comments:

1. Dancing
 - a. Played music for dancing and then stopped the music every few seconds to call on a student and have them name a green vegetable (no repeats) ($n=1$).
 - b. Participants did not do volleyball due to physical restrictions, so educator led chair exercises that were assigned for Lessons 1 and 2 ($n=1$).
 - c. Chicken dance worked well and directed movement was necessary for dance ($n=2$).
2. Volleyball
 - a. Participants liked balloon volleyball ($n=4$).
 - b. Volleyball did not work well as students were out of control ($n=1$).

Tasting comments:

1. Bite-sized Pieces of Any Washed Greens
 - a. Greens alone were not enjoyable ($n=1$).
 - b. Educator had students try each green alone and then in the salad ($n=2$).
2. Bean Salad
 - a. Participants liked the bean salad ($n=1$).
 - b. Participants did not like the bean salad because of its texture and because there were many items mixed together ($n=?$).
3. Mandarin Orange Salad
 - a. Dressing was very sweet ($n=1$).
4. "Salad"
 - a. Educator comments indicated that participants liked the salad but did not specify which salad ($n=3$).
5. Almonds
 - a. Could not be used because of participant allergies ($n=2$).
6. Sandwiches
 - a. Educator requested sandwich portion be added ($n=1$).

Conclusions

This first assessment of *LL:PID* suggests improvement in healthy eating among people with ID. The MFF's *LL:PID* program educator logs indicated that program fidelity was high: All class sections met the requirement of teaching at least four of the five topic areas, including both lessons (Parts A and B); all lessons included a tasting; and all lessons except one met the criteria of being 20 minutes in length. Thus, results indicated that the intervention was successful, in that it was implemented as intended and showed desired outcomes.

During this pilot, *LL:PID* was implemented 22 times with a total of 208 lessons taught and a total reach of 316 individuals. There are many noteworthy aspects of this pilot including the large reach, dedicated educator involvement, and extensive educator feedback. All of these components provided rich data on *LL:PID*'s strengths and potential areas of improvement.

Educators highlighted the strengths of this program and reported on educator logs that participants responded well to and enjoyed many aspects of this program. Further, review of process evaluation interviews revealed that educators appreciated that there was an intervention for this population and would highly recommend *LL:PID*:

"It's wonderful to be able to offer something specifically to classrooms for people with cognitive disabilities."

"The fact that it is designed for people with cognitive disabilities. This is the first in the 8-10 years that I have been teaching, that I have seen this. It really sets [the intervention] Linking Lessons for People with Cognitive Disabilities apart."

"The sites and partner leaders were very appreciative of an opportunity to bring programming to this population. We had great success partnering to do this."

"It was such a pleasurable experience. The program was different and new, but simple. By the end of the program, the participant group was really excited every time we came. The tastings and the PA were really enjoyed. It gave me joy because the participants were looking forward to the lessons and the lesson encouraged the participants to try foods that they usually wouldn't try. Bringing them joy brought me joy."

Given the large number of individuals living with ID in the United States and the rate of poverty among, and specific needs of, people living with ID, nutrition programs designed for people living with ID are crucial. Further, only one SNAP-Education intervention tailored to serve individuals living with disabilities was identified, but the program was specifically designed for individuals living with physical disabilities and impairments, not those living with ID (United States Department of Agriculture, 2020a, 2020c). The program evaluation reported here is an important first step in providing SNAP-Education practice-based evidence that *LL:PID* is effective in providing nutrition education to people living with ID.

Recommendations

Based on the educator logs, the following list of recommendations was created. Educators were asked to provide specific feedback about any modifications they made to the lessons, which resulted in a higher number of reported lesson modifications and recommendations compared to the number of lesson strengths. The main recommendation that emerged from educator logs was a request to identify the target population for the *LL:PID* program. Providing more clear

guidance on the target population for which this program is intended will address many of the educators' recommendations that are provided below.

- 1. Provide guidance on *LL:PID*'s target audience or lesson modifications to meet various levels of participant intellectual and physical abilities.** Instructor feedback revealed that groups had participants with diverse intellectual and physical abilities. Guidance on *LL:PID*'s target audience or lesson modifications for varying intellectual and physical abilities will help ensure that participants are able to take part in and gain all the benefits of the *LL:PID* program, and will encourage fidelity in implementation by removing some of the need for modifications.
- 2. Provide guidance to educators and partner organizations on forming participant groups.** Educator logs indicated that some classes had as many as 38 participants, which created challenges, such as having enough time for all students to participate in all of the tastings.
- 3. Modify tastings to align more closely with the lesson plans.** Several educators commented that some of the tastings did not connect to the talking points, in particular for the topic of Vegetables and Fruits.
- 4. Consider other formats and allow more time for the *That's Me: My Choices* outcome surveys.** Educators commented that the survey content and/or scantron format might have been challenging for this population to complete. Other educators requested more guidance on how to help participants complete the outcome surveys and more time to ensure outcome surveys were completed accurately.
- 5. Provide additional content for educators to extend the lesson.** Educators requested additional teaching content to extend the lessons when participants are particularly engaged.
- 6. Modify educator logs for program assessment.** Analysis of the educator logs used to assess program fidelity revealed that educators had trouble completing the "unduplicated count" and "number attending" sections at the top of the log. Further, the educator logs asked educators specifically about lesson modifications. This could have led to an underreporting of program strengths, what educators liked, and what worked well. While program strengths were discussed in the process evaluation calls, it could be helpful to give educators another medium to report program successes. It might also be beneficial to incorporate additional questions into the log to capture how content was received by the participant group based on participant abilities or to include space for educators to provide comments on each lesson, lesson materials, tasting, and physical activity. Modifying educator logs to include prompts for these topics could help give more complete information about *LL:PID*.

References

- American Association on Health and Disability. (2011). Obesity and Disability. Retrieved from <http://www.aahd.us/wp-content/uploads/2012/03/Obesity2011.pdf>
- Center for Disease Control. (2011). Cognitive Impairment: A Call for Action, Now! Retrieved from https://www.cdc.gov/aging/pdf/cognitive_impairment/cogimp_poilicy_final.pdf
- Centers for Disease Control and Prevention. (2019). Facts About Intellectual Disability. Retrieved from <https://www.cdc.gov/ncbddd/developmentaldisabilities/facts-about-intellectual-disability.html>
- Kraus, L., Lauer, E., Coleman, R., & Houtenville, A. (2018). 2017 Disability Statistics Annual Report.
- Ptomey, L. T., & Wittenbrook, W. (2015). Position of the Academy of Nutrition and Dietetics: nutrition services for individuals with intellectual and developmental disabilities and special health care needs. *J Acad Nutr Diet*, 115(4), 593-608.
doi:10.1016/j.jand.2015.02.002
- SAS Institute Inc. (2016). SAS 9.4. Cary North Carolina.
- United States Department of Agriculture. (2019). SNAP Eligibility. Retrieved from <https://www.fns.usda.gov/snap/recipient/eligibility>
- United States Department of Agriculture. (2020a). SNAP-Ed Toolkit: List of Interventions. Retrieved from <https://snapedtoolkit.org/interventions/list-of-interventions/>
- United States Department of Agriculture. (2020b). Supplemental Nutrition Assistance Program Education Plan Guidance FFY 2021. Retrieved from <https://snaped.fns.usda.gov/program-administration/guidance-and-templates>
- Valerie, L., Sheryl, C., Jonathan, B., Karen, D., Pamela, W., Ruth, M., . . . James, H. (2013). *Supplemental Nutrition Assistance Program Education and Evaluation Study (Wave II)*. Retrieved from <https://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program-education-and-evaluation-study-wave-ii>