

## RESEARCH ARTICLE

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### Factors Related to Head Start Teachers' Implementation of Physical Activity Programming

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This study examined factors that predicted Head Start preschool teachers' use of the physical activity components of *I am Moving, I am Learning* (IM/IL), a nationally disseminated obesity prevention program. Lead teachers ( $n=120$ ) in a large city in the United States completed questionnaires to self-report IM/IL implementation, demographic information, their general attitudes toward physical activity promotion, and their specific attitudes about implementing IM/IL. Three variables were associated with teachers' program usage: (a) prior teacher training, (b) teachers' perceptions about program usability, and (c) teachers' prior experience leading physical activity. Results also highlighted Head Start teachers' positive attitudes about the benefits of promoting physical activity. Many Head Start teachers described IM/IL as a feasible and acceptable physical activity promotion program. However, training opportunities were variable and more comprehensive and consistent training would be important.

*Keywords:* community health, physical activity programs, child obesity, pre-school

Children typically do not engage in recommended levels of physical activity while in early care and education settings (Pate, McIver, Dowda, Brown, & Addy, 2008; Pate, Pfeiffer, Trost, Ziegler, & Dowda, 2004; Shen et al., 2012). Recent studies have highlighted the positive relationship between motor skills and participation in physical activity (Fisher et al., 2005; Williams, Carter, Kibbe, & Dennison, 2008). It is suggested that children with more advanced gross motor skills are more likely to engage in physical activity. Moreover, research has also highlighted that physical activity is positively related to cognitive development among elementary school children (Sibley & Etnier, 2003) and may improve children's ability to exert effortful and goal directed behavior (Best, 2010). Together, these findings highlight the

importance of promoting physical activity with young children to prevent childhood obesity and to instill healthy habits at a young age.

One explanation for the low physical activity levels across early care settings may be that there is variability in how programs promote physical activity (Bower et al., 2008; Pate et al., 2004). The limited research on physical activity promotion within childcare settings show that structured curriculum-based programs are associated with higher levels of moderate to vigorous physical activity (Annesi, Smith, & Tennant, 2013; Fitzgibbon et al. 2011; Trost, Fees, & Dzewaltowski, 2008; Van Cauwenberghw, De Craemer, De Decker, & Cardon, 2013). Although basic interventions, such as adding playground equipment or leading simple gross motor activities 30 minutes per day (Binkley & Specker, 2004), are associated with small increases in children's physical activity levels, the extent to which improvements in physical activity levels are sustained remains questionable (Finch, Jones, Yoong, Wiggers & Woldendum, 2016; Sims, Scarborough, & Foster, 2015). Moreover, there is a growing recognition of the need for multi-component interventions (Hoelscher, Kirk, Ritchie, & Cunningham-Sabo, 2013; Howie et al., 2014) and physical activity related training and resources for teachers (De Marco, Zeisel, & Odom, 2014; Pate et al., 2016).

Many Head Start programs utilize *I am Moving, I am Learning* (IM/IL), a flexible program focused on preventing childhood obesity among young children. Although recent evidence suggested obesity levels have plateaued (Pan, Blanck, Sherry, Dalenius, & Grummer-Strawn, 2012) among children of color and children from low-income households, the prevalence of obesity rates remain at concerning levels (Ogden, Carroll, Kit, & Flegal, 2014). IM/IL's physical activity goals are to increase the quantity of time children spend in moderate to vigorous physical activity during their daily routine in order to meet national guidelines for physical activity and to improve the quality of structured movement experiences facilitated by teachers and adults (Finkelstein et al., 2007; Fox, Hallgren, Boller, & Turner, 2010). Despite widespread dissemination, there are limited data on how teachers use IM/IL and the impact that IM/IL has on children's physical activity (Fox et al., 2010). IM/IL was developed as a flexible program that would fit seamlessly into Head Start programming with each site having autonomy over implementation (Fox et al., 2010). Given this flexibility in program usage, it is important to understand how often teachers implement the program's varied activities. This is particularly important because children's physical activity levels across childcare sites (Pate et al, 2008; Pate et al., 2004; Trost, Fees, & Dzewaltowski, 2008) and schools (Dusenbury, Brannigan, Falco, & Hansen, 2003; Rohrbach, Graham, & Hansen, 1993) vary. Teacher characteristics, such as enthusiasm, self-efficacy, and preparedness, have contributed to higher levels of program implementation (Rohrbach et al., 1993). Moreover, teacher perceptions of treatment acceptability (Kazdin, 1980), program feasibility (Elliot, 1988; Reimers, Wacker, & Koepl, 1987), program impact (Von Brock & Elliot, 1987), understanding the steps involved in implementation (Reimers, Wacker, & Koepl, 1987), and administrator support (Han & Weiss, 2005; Rohrbach et al., 1993) may also influence program usage. Ultimately, multiple, interconnected factors may be involved with program usage (Briesch, Chafouleas, Neugebauer, & Riley-Tillman, 2013), and it is important for research to further explore factors related to intervention fidelity (Dusenbury et al., 2003).

In preschool settings, teachers are often responsible for leading physical activities, yet research has not sufficiently explored how preschool teachers' attitudes relate to their preparedness and willingness to implement this type of instruction. Qualitative studies have illustrated varying attitudes, with some teachers expressing beliefs that it was not their role to

lead structured physical activities (Cashmore & Jones, 2008; O'Connor & Temple, 2005) or implement this type of programming (Derscheid, Umoren, Kim, Henry, & Zittel, 2010). In the initial IM/IL evaluation, the majority of teachers endorsed feeling enthusiastic about the program (Finkelstein, 2007). However, in follow-up, half of the Head Start programs identified staff buy-in as a barrier to implementation (Fox et al., 2010).

The relationship between preschool teachers' attitudes and their use of physical activity programming is an area that deserves further exploration. Within school settings, intervention integrity and sustainability are common problems (Pence, Justice, & Wiggins, 2008; Whitehurst et al., 1994), and it is valuable to determine which teacher factors correspond with more frequent and broader utilization of IM/IL. The primary objective of this study was to examine teachers' general attitudes about physical activity programming and their specific beliefs about IM/IL in relationship to their IM/IL implementation. This study sought to answer the following research questions: (1) How frequently do Head Start teachers use each of the IM/IL physical activity components? (2) Do Head Start teachers' general attitudes toward promoting physical activity predict how often they implement physical activity components of IM/IL? (3) Do Head Start teachers' attitudes toward the IM/IL program in particular predict how often they implement physical activity components of IM/IL?

## METHODS

### Participants

Lead teachers ( $n=167$ ) from Head Start programs ( $n=22$ ) in a large city in the Northeast were invited to participate ( $n=120$  teachers participated; 72% response rate). Participant characteristics and demographics are described in Table 1. Participation was voluntary and anonymous.

### Instruments

A four-part teacher questionnaire was developed for this study that measured teachers' demographics, IM/IL implementation, general attitudes toward physical activity promotion in preschool, and specific attitudes toward implementing IM/IL. The questionnaire was reviewed and revised by a group of university-based experts in childhood obesity prevention and implementation science and Head Start administrators. The questionnaire was pilot tested with two Head Start teachers.

*Demographic questions.* This section included questions about teachers' gender, race, ethnicity, the number of years they taught preschool children, and the number of years they taught in Head Start.

*Teachers' IM/IL implementation.* This variable measured the frequency with which teachers implemented IM/IL program lessons, activities, and components in the past year (Rohrbach et al., 1993). The five IM/IL physical activity components included: (1) listening to the *Choosy* CD; (2) incorporating equipment (e.g., jump rope, hula-hoop) and props (e.g.,

scarves, sticks) in physical activity; (3) leading basic movement activities (e.g., stretching, running, jumping); (4) leading structured activities; and (5) using movement vocabulary (Fox et al., 2010). Response options included: *never, about once a month, about once a week, 2-3 times a week, 4-5 days a week, and several times a day.*

TABLE 1  
Head Start Teacher Demographic Characteristics (N = 120)

	N	%
<i>Gender</i>		
Female	116	96.7
Male	4	3.3
<i>Race</i>		
Black/African American	39	33
Other	37	31.6
White	31	26.5
Asian/Pacific Islander	9	7.7
American Indian or Alaskan Native	1	0.9
<i>Ethnicity</i>		
Non-Hispanic/Latino	71	71.7
Hispanic/Latino	28	28.3
<i>Leading Physical Activities</i>		
Experience	97	79.3
No Experience	22	20.7
<i>Training</i>		
Received IM/IL Training	92	79.3
Did not receive IM/IL Training	24	20.7

**Teachers' attitudes toward physical activity promotion.** This variable was measured using an 8-item General Attitude Scale for Physical Activity (GAS-PA) that was developed for this study. Items were developed based on findings from relevant research and the theory of planned behavior (Ajzen, 1991). Items focused on preschool teachers' attitudes in three general areas: (1) whether they perceive their students' levels of physical activity to be concerning; (2) how they see their role as a preschool teacher in the promotion of physical activity; and (3) how they view benefits associated with children engaging in physical activity (Table 2). Responses were based on a 6-point Likert scale (i.e., *strongly disagree to strongly agree*). The GAS-PA demonstrated high reliability ( $\alpha = .97$ ).

**Teachers' attitudes toward IM/IL.** This variable was assessed using a modified version of the Usage Rating Profile-Intervention Revised (URP-IR; Briesch et al., 2013). The URP-IR is a 29-item measure that assesses six factors that explain whether an individual will adopt and utilize an intervention over time (i.e., Acceptability, Understanding, Family School Collaboration, Feasibility, System Climate, and System Support). Responses were based on a 6-point Likert scale (i.e., *strongly disagree to strongly agree*). Reliability for the modified URP-IR was high ( $\alpha = .90$ ). Reliability for the Acceptability (9 items;  $\alpha = .83$ ), Understanding (3 items;

$\alpha=.86$ ), and System Climate (3 items;  $\alpha=.85$ ) subscales was high and similar to previous reliability estimates (Briesch et al., 2013). Although slightly lower, the Family School Collaboration subscale (3 items;  $\alpha=.71$ ) met the .70 criterion for research based scales (Netemeyer, Bearden, & Sharma, 2003). Scores for the Feasibility subscale (6 items;  $\alpha=.68$ ) and System Support subscale (3 items;  $\alpha=.67$ ) were slightly below this criterion suggesting mild concerns around their internal consistency.

## Procedures

All study procedures were approved by the Institutional Review Board. The first author met with Head Start education supervisors during a monthly meeting to outline the purpose of the study and logistics of survey administration. Teachers who completed the questionnaire were eligible to enter a lottery where they could win a \$20 gift card. Copies of the survey were delivered to all participating Head Start sites on the same day, and surveys were presented in an envelope with directions for administration.

## Data Analysis

Statistical analyses were conducted in PASW Statistics 18 (SPSS, Inc., 2009, Chicago, IL). The IM/IL Total Usage and IM/IL Component Usage scores were calculated to describe how frequently teachers reported utilizing IM/IL physical activity components over the school year. The IM/IL Total Usage score was calculated through computing the average of frequencies for all IM/IL components. The IM/IL Component Usage scores were calculated in the same manner for each major IM/IL component: (1) *Choosy* CD, (2) equipment and/or props, (3) basic movement activities, (4) structured activities, and (5) movement vocabulary. Usage scores ranged from 0 (never) to 5 (several times a day). Descriptive statistics were calculated for the IM/IL Total Usage variable and the IM/IL Component Usage variables.

Teacher responses on the GAS-PA and URP-IR were centered and converted into scores by averaging the values for teacher responses across items (Range = 0-5). Subscale scores on the URP-IR were similarly calculated through averaging teachers' responses across the items that comprised each of the six subscales. Descriptive statistics were calculated for teachers' responses on the GAS-PA and the modified URP-IR. Intra-class correlations (ICCs) were computed to evaluate whether there was a cluster effect within each Head Start site. The ICC value was calculated for the primary outcome (i.e., IM/IL Total Usage Score). To determine whether teachers' general attitudes toward physical activity and their specific attitudes toward IM/IL predicted their usage of IM/IL, a standard linear multiple regression was conducted using a stepwise method. The following predictor variables were entered into the model: teacher usability ratings (URP-IR scores), GAS-PA scores, previous IM/IL training, number of years of working with preschool students, and number of years leading physical activities:

$$Y_{\text{IM/IL Total Usage Score}} = \beta_0 + \beta_1 \text{URP-IR} + \beta_2 \text{GAS-PA} + \beta_3 \text{IM/IL Training} + \beta_4 \text{Preschool Experience} + \beta_5 \text{Physical Activity Experience} + \varepsilon.$$

TABLE 2  
Teacher Responses on the General Attitude Scale for-Physical Activity (GAS-PA) and Usage Rating Profile-Intervention Revised (URP-IR)

GAS-PA Items	Mean	SD	URP-IR Subscales	Mean	SD
I am concerned that children at my school do not get enough physical activity.	2.89	1.7	URP-IR Total Score	4.86	0.56
I think children should have the opportunity to be physically active during school.	5.44	1.14	Acceptability	5.16	0.62
As a teacher, I should play a role in helping my students be physically active.	5.46	1.1	Understanding	5.02	0.86
As a teacher, I should find opportunities for my students to be physically activity during the school day.	5.48	1.05	Family School Collaboration	4.48	1.1
As a teacher, I should lead activities that help my students be physically active during school.	5.45	1.06	Feasibility	4.88	0.67
I think that keeping students physically active helps them do better in their schoolwork.	5.38	1.1	System Climate	5.12	0.68
I think keeping students physically active helps them behave better in class.	5.24	1.24	System Support	3.70	1.23
I think that physical activity can help students' attention/concentration/focus.	5.30	1.13			

*Note. Scores ranged from 1 to 6; 1= Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Slightly Agree, 5=Agree, 6=Strongly Agree*

## RESULTS

### Teacher IM/IL implementation

Teachers' mean IM/IL Total Usage score was 2.64 ( $SD=0.73$ ), suggesting that components of IM/IL were implemented more than once per week (i.e., a score of 2 = about once a week; a score of 3 = 2-3 times a week). The most frequently used IM/IL component was vocabulary ( $M=3.50$ ,  $SD=1.04$ ), with teachers on average incorporating movement vocabulary into classroom activities nearly four to five days a week. The second most frequent component was implementing unstructured activities ( $M=3.16$ ,  $SD=0.88$ ), which teachers reported doing approximately two to three times per week. In contrast, teachers on average reported implementing structured activities ( $M=2.43$ ,  $SD=0.94$ ), using the *Choosy* CD ( $M=2.29$ ,  $SD=1.22$ ), and using equipment and props ( $M=1.95$ ,  $SD=0.84$ ) less often, approximately once a week.

### Teachers' Attitudes toward Physical Activity Promotion

Teachers' responses on the modified GAS-PA suggested strong positive attitudes about the importance and benefits of promoting physical activity (2). The overall mean was 5.40 ( $SD=1.02$ ) and the median value was 5.71, indicating most teachers agreed or strongly agreed with nearly all of the statements; indeed only five teachers (4.1%) reported disagreement with the statements. Average responses across items demonstrated minimal variability, with the mean scores ranging from 5.24 ( $SD=1.24$ ) to 5.48 ( $SD=1.05$ ).

### Teachers' Attitudes toward IM/IL.

Overall, the mean score on the URP-IR was 4.86 ( $SD=0.56$ ), suggesting that teachers agreed with most items (Table 2). Mean scores on the Acceptability subscale were the highest ( $M=5.16$ ,  $SD=.62$ ), indicating teachers agreed that IM/IL was an acceptable intervention. On the System Climate subscale, mean scores were similarly high ( $M=5.12$ ,  $SD=.68$ ), indicating that teachers believed the program was compatible with the school environment. Mean scores on the Understanding subscale also indicated that teachers understood how to implement IM/IL ( $M=5.02$ ,  $SD=.86$ ). Mean ratings were slightly lower on the Feasibility ( $M=4.88$ ,  $SD=.67$ ) and Family School Collaboration ( $M=4.48$ ,  $SD=1.1$ ) subscales. Lastly, teachers' mean scores on the System Support subscale ( $M=3.70$ ,  $SD=1.23$ ) suggested they slightly disagreed that they needed help from other staff to implement IM/IL.

### The Relationship Between Teacher Attitudes and IM/IL Usage

The ICC value of 0.01 was below the 0.1 standard for a small effect (Hox, 2002). Based on this finding, there was no clustering effect in the data, so teacher site was not taken into consideration in the analyses. The final model consisted of three predictor variables: prior IM/IL training ( $p < .001$ ), Mean URP-IR ( $p = .002$ ), and prior experience leading physical activity ( $p = .037$ ). Results

of the analysis suggested this model explained 27.5% of the variance in teachers' use of IM/IL,  $R^2=.275$ ,  $F(3,110)=13.54$ ,  $p<.001$ .

Overall, these results suggested that teachers who attended the IM/IL training endorsed using IM/IL more frequently ( $\beta = .73$  ( $SE = .16$ ),  $p = <.001$ ). Specifically, teachers who attended training scored .73 points higher on the IM/IL Total Usage than those who didn't attend the training. This difference corresponds to a medium effect size and indicates that IM/IL training was associated with more frequent usage of IM/IL (Cohen, 1988). Further, higher IM/IL usability scores on the URP-IR scale were associated with higher IM/IL Total Usage ( $\beta = .34$  ( $SE = .11$ ),  $p = .002$ ). In comparison to prior IM/IL training, the impact of URP-IR scores was smaller yet in the expected direction. Lastly, teachers' prior experience leading physical activities was also positively associated with the IM/IL Total Usage score ( $\beta = .26$  ( $SE = .12$ ),  $p = .037$ ). The effect size of this predictor was small (Cohen, 1988).

## DISCUSSION

Given limited research on the implementation of IM/IL, a nationally disseminated program, this study explored Head Start teachers' use of the program and factors that are related to its implementation. The results provide preliminary data on the frequency with which Head Start teachers in a large city in the United States utilize IM/IL to promote physical activity. Overall, reported estimates for leading structured activities were less than estimates for leading unstructured activities. One factor contributing to these results may be that leading unstructured activities (e.g., free play outside on the playground) require less planning and effort than structured activities. National recommendations suggest that preschool children engage in at least 60 minutes of structured active play every day (National Association for Sport and Physical Education, 2009; U.S. Department of Health and Human Services, 2010); therefore, this finding highlights the gap between current recommendations and actual practice and underscores the need to do more to help teachers promote structured active play in Head Start.

Another goal of this study was to explore preschool teachers' attitudes toward physical activity programming. Results revealed positive attitudes toward promoting physical activity in the classroom and the benefits associated with physical activity. This finding departed from previous qualitative studies where themes emerged regarding teacher reports of physical activity programming not aligning with their role (Cashmore & Jones, 2008; Derscheid et al., 2010; O'Connor & Temple, 2005). In the current study, teachers also reported positive perceptions regarding the usability of IM/IL, suggesting high intervention acceptability, good program understanding, perceptions that the program was feasible to implement and that it fit with their Head Start context, and that increased family school collaboration may strengthen the program. Prior research has found that teachers' enthusiasm for, comfort with, and beliefs about the strength of programs are associated with higher implementation fidelity (Rohrbach et al., 1993), so our findings are encouraging for IM/IL usability within Head Start classrooms.

### Limitations

The following limitations should be considered when interpreting study findings. First, participants were restricted to one city and data may not be generalizable to Head Start programs

beyond that city. Second, results are based on teacher self-report. Research has highlighted validity concerns with using self-report measures to assess implementation integrity involving school-based interventions (Fiske, 2008; Pence et al., 2008). Given this issue, efforts to ensure anonymity were made to promote accurate reporting. Third, the IM/IL Total Usage score may have failed to capture some of the variability that exists between classrooms. For the measurement of both structured and unstructured activities, teachers endorsed a range of usage (e.g., 2 to 3 times a week, several times a day) rather than providing a specific frequency (e.g., 5 times a week). Although this IM/IL Total Usage score provides general information on teacher use of IM/IL, the response categories did not allow for calculating the true difference between teachers' usage.

## IMPLICATIONS FOR SCHOOL HEALTH

Physical activity promotion programs are associated with increases in children's physical activity levels (Annesi et al., 2013; Binkley & Specker, 2004; Fitzgibbon et al. 2011; Hannon & Brown, 2008; Trost et al., 2008). IM/IL is designed for Head Start programs that serve children at increased risk for overweight and obesity and allows for flexibility and autonomy over implementation. The Head Start teachers in this study believed that IM/IL is a feasible, understandable, and acceptable program. Teachers reported promoting physical activity throughout the day by engaging students in various unstructured movement activities. Moving forward, it is important to understand reasons for teachers' higher frequency facilitating unstructured active play relative to their lower frequency leading structured active play, and relatedly, barriers and facilitators of implementing structured activities in the classroom. Program sustainability is a common problem within schools (Pence et al., 2008; Whitehurst et al., 1994). To ensure optimal implementation, it is important to provide teachers with ongoing support, interactive training and consultation (De Marco et al., 2010; Howie et al., 2014; Pate et al., 2016) and to make sure that IM/IL training is part of the orientation when new teachers are hired. Results from this study suggested the Head Start teachers have attended training/s on IM/IL. For further improvement, Head Start sites focus on continuing to evaluate and strengthen their IM/IL training program to increase teachers' use of structured activities. Flexibility is considered an important factor when implementing obesity prevention programming (Adams, Zask, & Dietrich, 2009; Howie et al., 2014), which is a fundamental feature of IM/IL. As such, to capitalize on this strength and ensure more frequent implementation, it is important to promote teachers' comfort in using all IM/IL components independently.

## CONCLUSIONS

The current study demonstrated that prior exposure to IM/IL training, teachers' perceptions of program usability, and their prior experience leading physical activities were associated with higher levels of IM/IL usage. The strongest predictor of IM/IL usage was previous participation in IM/IL training. These results support previous research suggesting that training is a significant component of program implementation (Durlak & DuPre, 2008), particularly physical activity programming (De Marco et al., 2014; Pate et al., 2016). Also, teachers who felt positively about factors commonly related to intervention implementation (e.g., acceptability, understanding,

feasibility) were more likely to use IM/IL. Findings from this study suggest that evaluating attitudes toward specific physical activity promotion programs (e.g., feasibility, system support, and climate) may be more important than general attitudes about teachers' roles in physical activity promotion.

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## REFERENCES

- Adams, J., Zask, A., & Diethrich, U. (2009). Tooty Fruity Veggie in preschools: An obesity prevention intervention in preschools targeting children's movement skills and eating behaviors. *Health Promotion Journal of Australia, 20*(2), 112-119. doi:10.1071/HEO9112
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.
- Annesi, J. J., Smith, A. E., & Tennant, G. (2013). Cognitive-behavioral physical activity treatment in African-American preschoolers: effects of age, sex, and BMI. *Journal of Pediatric Child Health, 49*(2), E128-132. doi:10.1111/jpc.12082
- Best, J. R. (2010). Effects of physical activity on children's executive function: Contributions of experimental research on aerobic exercise. *Developmental Review-Journal, 30*(4), 331-351. doi:10.1016/j.dr.2010.08.001
- Binkley, T., & Specker, B. (2004). Increased periosteal circumference remains present 12 months after an exercise intervention in preschool children. *Bone, 35*(6), 1383-1388. doi:10.1016/j.bone.2004.08.012
- Bower, J. K., Hales, D. P., Tate, D. F., Rubin, D. A., Benjamin, S. E., & Ward, D. S. (2008). The childcare environment and children's physical activity. *American Journal of Preventative Medicine, 34*(1), 23-29. doi:10.1016/j.amepre.2007.09.022
- Briesch, A. M., Chafouleas, S. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2013). Assessing influences on intervention implementation: Revision of the usage rating profile-intervention. *Journal of School Psychology, 51*, 81-96. doi:10.1016/j.jsp.2012.08.006
- Cashmore, A. W., & Jones, S. C. (2008). Growing up active: A study into physical activity in long day care centers. *Journal of Research in Childhood Education, 23*(2), 179-191. doi:10.1080/02568540809594654
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences: Second edition*. Mahwah, NJ Lawrence Erlbaum Associates
- De Marco, A. C., Zeisel, S., & Odom, S. L. (2014). An evaluation of a program to increase physical activity for young children in child care. *Early Education and Development, 26* (1), 1-21. doi:10.1080/10409289.2014.932237
- Derscheid, L. E., Umoren, J., Kim, S-Y., Henry, B. W., & Zittel, L. L. (2010). Early childhood teachers' and staff members' perceptions of nutrition and physical activity practices for preschoolers. *Journal of research in Childhood Education, 24*(3), 248-265. doi:10.1080/02568543.2010.487405
- Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41*(3-4), 327-350. doi:10.1007/s10464-008-9165-0
- Dusenbury, L., Brannigan, R., Falco, M., & Hansen, W. B. (2003). A review of research on fidelity of implementation: Implications for drug abuse prevention in school settings. *Health Education Research, 18*(2), 237-256.
- Elliot, S. N. (1988). Acceptability of behavioral treatments: Review of variables that influence treatment selection. *Professional Psychology: Research and Practice, 19*(1), 68-80.

- Finch, M., Jones, J., Yoong, S., Wiggers, J., & Woldenden, L. (2016). Effectiveness of centre-based childcare interventions in increasing child physical activity: A systematic review and meta-analysis for policymakers and practitioners. *Obesity Review*, *17*(5), 412-428. doi:10.1111/obr.12392
- Finkelstein, D., Whitaker, R., Hill, E., Fox, M. K., Mendenko, L., & Boller, K. (2007). *Results from the "I Am Moving, I am Learning" stage 1 survey* (Final Interim Report). Princeton, NJ: Mathematica Policy Research, Inc. Retrieved from [http://www.acf.hhs.gov/sites/default/files/opre/stage1\\_survey.pdf](http://www.acf.hhs.gov/sites/default/files/opre/stage1_survey.pdf)
- Fisher, A., Reilly, J. J., Kelly, L. A., Montgomery, C., Williamson, A., Paton, J. Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine & Science in Sports & Exercise*, *37*(4), 684-688. doi:10.1249/01.MSS.0000159138.48107.7D
- Fiske, K. E. (2008). Treatment integrity of school-based behavior analytic interventions: A review of the research. *Behavioral Analysis in Practice*, *1*(2), 19-25.
- Fitzgibbon, M. L., Stolley, M. R., Schiffer, L., Braunschweig, C. L., Gomez, S. L., Van Horn, L., & Dyer, A. (2011). Hip-Hop to Health Jr. obesity prevention effectiveness trial: Post-intervention results. *Obesity*, *19*(5), 994-1003. doi:10.1038/oby.2010.314
- Fox, M. K., Hallgren, K., Boller, K., & Turner, A. (2010). *Efforts to meeting children's physical activity and nutritional needs: Findings from the I am Moving, I am Learning implementation evaluation* (Final Report). Washington, DC: US Department of Health and Human Services. Retrieved from [http://www.mathematicampr.com/publications/pdfs/earlychildhood/IML\\_implementation\\_eval.pdf](http://www.mathematicampr.com/publications/pdfs/earlychildhood/IML_implementation_eval.pdf).
- Han, S. S., & Weiss, B. (2005). Sustainability of teacher implementation of school-based mental health programs. *Journal of Abnormal Child Psychology*, *33*(6), 665-679. doi:10.1007/s10802-005-7646-2
- Hannon, J. C., & Brown, B. B. (2008). Increasing preschoolers' physical activity intensities: An activity-friendly preschool playground intervention. *Preventative Medicine*, *46*(6), 532-536. doi:10.1016/j.ypmed.2008.01.006
- Hoelscher, D. M., Kirk, S., Ritchie, L., & Cunningham-Sabo, L. (2013). Position of the Academy of Nutrition and Dietetics: Interventions for the prevention and treatment of pediatric overweight and obesity. *Journal of the Academy of Nutrition and Dietetics*, *113*(1), 1375-1394. doi:10.1016/j.jand.2013.08.004
- Howie, E. K., Brewer, A., Brown, W. H., Pfeiffer, K. A., Saunders, R. P., & Pate, R. R. (2014). The 3-year evolution of a preschool physical activity intervention through a collaborative partnership between research interventionists and preschool teachers. *Health Education Research*, *29*(3), 491-502. doi:10.1093/her/cyu014
- Hox J. (2002). *Multilevel analysis techniques and applications*. Mahwah, NJ: Lawrence Erlbaum.
- Kazdin, A. E. (1980). Acceptability of alternative treatments for deviant child behavior. *Journal of Applied Behavior Analysis*, *13*(2), 259-273.
- National Association for Sport and Physical Education (NASPE). (2009). *Active start: A statement of physical activity guidelines for children birth to five years*. Washington, DC:
- Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Thousand Oaks, CA: Sage.
- O'Connor, J. P., & Temple, V. A. (2005). Constraints and facilitators for physical activity in family day care. *Australian Journal of Early Childhood*, *30*(4), 1-9.
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood obesity and adult obesity in the United States, 2011-2012. *JAMA; Journal of the American Medical Association*, *311*(8), 806-814. doi:10.1001/jama.2014.732.
- Pan, L., Blanck, H. M., Sherry, B., Dalenius, K., & Grummer-Strawn, L.M. (2012). Trends in the prevalence of extreme obesity among U.S. preschool-aged children living in low-income families, 1998-2010. *JAMA: Journal of the American Medical Association*, *308*(24), 2563-2565. doi:10.1001/jama.2012.108099.
- Pate, R. R., McIver, K., Dowda, M., Brown, W. H., & Addy, C. (2008). Directly observed physical activity levels in preschool children. *Journal of School Health*, *78*(8), 438-444. doi:10.1111/j.1746-1561.2008.00327.x.
- Pate, R. R., Brown W. H., Pfeiffer K. A., Howie, E. K., Saunders, R. P., Addy, C. L., & Dowda, M. (2016). An intervention to increase physical activity in children: A randomized controlled trial with 4-year-olds in preschools. *American Journal of Preventative Medicine*, *51*(1), 12-22. doi:10.1016/j.amepre.2015.12.003
- Pate, R. R., Pfeiffer, K. A., Trost, S. G., Ziegler, P., & Dowda, M. (2004). Physical activity among children attending preschools. *Pediatrics*, *114*(5), 1258-1263.
- Pence, K. L., Justice, L. M., Wiggins, A. K. (2008). Preschool teachers' fidelity in implementing a comprehensive language-rich curriculum. *Language, Speech, and Hearing Services in Schools*, *39*(3), 329-341. doi:1044/0161-1461

- Reimers, T. M., Wacker D. P., & Koepl, G. (1987). Acceptability of behavioral interventions: A review of the literature. *School Psychology Review*, 16, 212-227.
- Rohrbach, L. A., Graham, J. W., & Hansen, W. B. (1993). Diffusion of school-based substance abuse prevention program: Predictors of program implementation. *Preventative Medicine*, 22(2), 237-260.
- Shen, B., Reinhart-Lee, T., Janisse, H., Brogan, K., Danford, C. & Jen, K. C. (2012). African American preschool children's physical activity levels in Head Start. *Research Quarterly for Exercise and Sport*, 83(2), 168-174. doi:10.1080/02701367.2012.10599847
- Sibley, B. A., & Etnier, J. L. (2003). The relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science*, 15(3), 243-256.
- Sims, J., Scarborough, P., & Foster, C. (2015). The effectiveness of interventions on sustained childhood physical activity: A systematic review and meta-analysis of controlled studies. *PLoS ONE*, 10(7), e0132935. doi:10.1371/journal.pone.0132925
- SPSS Inc. Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.
- Trost, S. G., Fees, B., & Dzewaltowski, D. (2008). Feasibility and efficacy of a "Move and Learn" physical activity curriculum in preschool children. *Journal of Physical Activity & Health*, 5(1), 88-103.
- Van Cauwenberghe, E., De Craemer, M., De Decker, E., & Cardon, G. (2013). The impact of a teacher-led structured physical activity session on preschoolers' sedentary and physical activity levels. *Journal of Science and Medicine in Sport*, 16(5), 422-426. doi:10.1016/j.jsams.2012.11.883
- Von Brock, M. B., & Elliot, S. N. (1987). The influence of treatment effectiveness information on the acceptability of classroom interventions. *Journal of School Psychology*, 25(2), 131-144.
- Whitehurst, G. J., Epstein, J. N., Angell, A. C., Payne, A. C., Crone, D. A., & Fischel, J. E. (1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of Educational Psychology*, 86(4), 542-555.
- Williams, C. L., Carter, B. J., Kibbe, D. L., & Dennison, D. (2008). Increasing physical activity in preschool. A pilot study to evaluate Animal Trackers. *Journal of Nutrition Education and Behavior*, 41(1), 47-52. doi:10.1016/j.neb.2008.03.004
- U.S. Department of Health and Human Services (2010). *The Surgeon General's vision for a healthy and fit nation*. Retrieved from <http://www.surgeongeneral.gov/initiatives/healthy-fit-nation/obesityvision2010.pdf>