

ORIGINAL ARTICLE

Examining barriers, physical activity, and weight change among parents and nonparents in a weight loss intervention

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Summary**Introduction:** Little is known about the influence of children in the home on physical activity and weight among adults in weight loss interventions. This study evaluated the association between number of children in the home, weight loss, and weight regain in a behavioural weight loss intervention, and whether those relationships were mediated in sequence by physical activity barriers and physical activity changes.**Methods:** The sample included 267 participants from a randomized trial who had complete data on study variables. Variables at baseline, 6, and 18 months included physical activity barriers, objectively measured minutes of moderate-to-vigorous physical activity (MVPA), and objectively measured weight used to calculate percent weight loss (PWL) from baseline to 6 months and percent weight regained (PWG) from 6 to 18 months.**Results:** A greater number of children in the home was associated with less PWL at 6 months. This relationship was mediated by greater baseline physical activity barriers and a smaller increase in MVPA at 6 months. The mediated effect was no longer significant when controlling for changes in dietary intake. There was no relationship between number of children and PWG from 6 to 18 months.**Conclusions:** Parents may need unique intervention supports to overcome barriers to initiation of physical activity to help them reach optimal weight loss.**KEYWORDS**

mediation, obesity, parents, physical activity

1 | INTRODUCTION

Observational research suggests that having children in the home increases the risk of obesity.¹⁻³ Behavioural weight loss interventions targeting changes in both dietary intake and physical activity lead to weight losses of 8% TO 10% over 6 months,⁴ but to this date, no studies have examined the weight loss success of adults with children compared with adults without children within these interventions.

The initiation or increase of physical activity is a key focus of behavioural weight loss interventions that leads to both short- and long-term weight loss, particularly in combination with dietary changes.⁵⁻⁷ Despite the health benefits, only 9.6% of adults currently meet objectively measured physical activity recommendations, which include 150 minutes of moderate physical activity a week or 75 minutes of vigorous physical activity.^{8,9} Even fewer meet the 250-minute recommendation for individuals seeking to lose weight.⁵ Even

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within behavioural interventions, in which participants join voluntarily and are motivated to lose weight, there is wide variability in physical activity. Little is known about the predictors of this variability; however, adults with dependent children in the home may be a population at risk of not meeting physical activity recommendations because of the responsibilities related to taking care of children.

Epidemiological research has studied the physical activity levels of parents and nonparents using both self-reported and objective measures of activity.^{1,10-13} Cross-sectional studies using self-report data have shown that adults caring for children have lower physical activity levels than adults without children.^{1,10,13} Young adult parents, in particular, are estimated to have approximately 1 hour less of moderate-to-vigorous physical activity (MVPA) per week than nonparents.¹ Longitudinal research supports a causal effect of becoming a parent on decreased self-reported physical activity, with several studies finding that physical activity levels decrease during the transition into parenthood compared with adults who remain childless.^{11,12}

Studies using objective measurements of physical activity, which limit self-report bias and recall error, have not conclusively demonstrated that parents' MVPA levels differ from those of nonparents. Although two studies found no differences in MVPA between adults without children and adults with any number of children,^{14,15} one study found that for women only, MVPA was lower among those with two or more children compared with those with none.¹⁶ A longitudinal study found that women who had their first child during the 12-month study window had a significant decrease in MVPA compared with women who did not have children.¹⁷

Adults with children report multiple barriers to physical activity.¹⁸⁻²² Social cognitive theory (SCT), which posits that environmental, personal, and social barriers can inhibit behaviour change,²³ suggests that these barriers may have an influence on engagement in physical activity and thus may be associated with weight change. In fact, research has shown that there is a negative association between perceived activity barriers and physical activity levels.²⁴ Many of parents' perceived activity barriers are similar to those for all adults, but

98.6% of mothers report that time commitments for children are a barrier to physical activity.¹⁹ Other barriers among parents include lack of childcare and feeling guilt for taking time away from family-related duties.^{18,20-22}

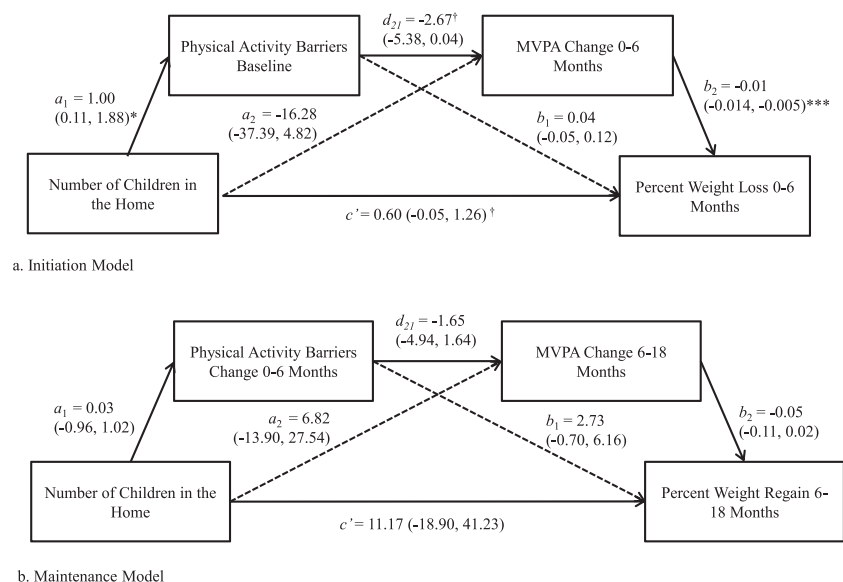
The evidence suggests that there may be differences between adults with and without children in terms of how they perceive, prioritize, and engage in physical activity. What has not yet been studied is the influence of children in the home on parents' physical activity changes and weight change during intentional weight loss efforts. The objective of this study was to evaluate if the number of children in the home influenced a 6-month weight loss and weight regain from 6 to 18 months in a behavioural weight loss intervention, and whether those relationships were mediated in sequence by barriers to physical activity and changes in MVPA. It was hypothesized that the number of children in the home would be inversely associated with weight loss at 6 months and the relationship would be mediated in sequence by baseline physical activity barriers and change in MVPA at 6 months. The number of children would be positively associated with baseline physical activity barriers, which in turn would be associated with a lower increase in MVPA from baseline to 6 months. Secondly, it was hypothesized that an increasing number of children would be associated with a smaller reduction in physical activity barriers from baseline to 6 months, which in turn would be associated with a greater reduction in MVPA from 6 to 18 months and greater weight regain from 6 to 18 months (see Figure 1 for conceptual models).

2 | METHODS

2.1 | Study design and participants

The current study is a secondary analysis using data from a completed 18-month randomized controlled trial for adults that compared a standard behavioural weight loss approach to a stepped approach in which participants were moved to progressively higher

FIGURE 1 Depiction of serial mediation models and estimates and confidence intervals for each pathway. MVPA = moderate-to-vigorous physical activity. Significance of unstandardized regression coefficients, [†] $P < .10$, ^{*} $P < .05$, ^{**} $P < .01$, ^{***} $P < .001$



stages of contact when they did not meet their weight loss goals.²⁵ Participants in the original randomized trial (N = 363) had a BMI between 25 and less than 40 kg/m², were between the ages of 18 and 55, were not currently pregnant or pregnant in the last 6 months, and participated in less than 60 minutes of MVPA per week. In the standard behavioural group, participants attended weekly group meetings for 6 months, followed by biweekly meetings for 6 months and monthly meetings for the final 6 months. In the stepped group, face-to-face meetings monthly for 18 months; participants who were moved to progressively higher stages could also receive telephone counselling, individual sessions, and meal replacements. Both groups were encouraged to reduce energy intake to 1200 to 1500 kcal/day, reduce fat intake to 20% to 30% of total daily calories, and progress to 300 minutes per week of MVPA. Because the exercise recommendations in both groups were the same, the current study collapsed analyses across treatment groups and included it as a covariate in all models.

2.2 | Measures

Percent weight loss (PWL) and percent weight regain (PWG). Weight was objectively measured by trained study staff at all assessment points to 0.1 kg using a Tanita digital scale. The outcome variable at 6 months was PWL. The outcome variable for the 6 to 18-month weight change was PWG, which was the percent of weight lost from baseline to 6 months that was regained between 6 and 18 months. Percent weight change variables were calculated using the following formulas:

$$\text{PWL} = \left(\frac{\text{Weight at 6 months} - \text{Baseline Weight}}{\text{Baseline Weight}} \right) \times 100$$

$$\text{PWG} = \left(\frac{\text{Weight at 6 months} - \text{Weight at 18 months}}{\text{Weight at 6 months} - \text{Weight at Baseline}} \right) \times 100.$$

PWL has increasingly negative values as weight loss increases. In the PWG analyses, to evaluate weight regain as a percentage of initial weight lost, the one participant who gained weight from baseline to 6 months was removed from the sample. Thus, positive values of PWG represented weight regain after initial weight loss, and negative values represented continued weight loss.

Number of children in the home. Participants reported the number of children under the age of 18 in the home at baseline. For descriptive purposes, an additional variable was created that classified parents as having no children, one child, two children, or three or more children in the home.

Physical activity barriers. Perceived physical activity barriers were assessed at baseline and 6 months using a 26-item scale with 12 items about expected benefits of physical activity and 14 items about barriers.²⁶ The physical activity barriers variable was calculated as the sum of the 14 barriers items. Examples of items included "The major reason when I do not exercise is ..." "... that I do not have enough

time" (1 = strongly disagree to 5 = strongly agree). The barriers subscale has a reliability coefficient of 0.72 in this sample.

Physical activity. Physical activity was assessed at baseline, 6, and 18 months using the SenseWear Pro Armband (BodyMedia, Inc). Participants were instructed to wear the armband for 7 days during each assessment period. Data were considered valid if there were at least 4 days of data with at least 10 hours of wear time, based on a previously validated method of accelerometry data reduction.²⁷ Weekly minutes of MVPA was calculated using data from combined bouts of activity that were at least 10 minutes in duration at three or more metabolic equivalent tasks (METs), which is the criteria for defining moderate-to-vigorous physical activity established by the American College of Sports Medicine and the American Heart Association.²⁸

Dietary intake. A food frequency questionnaire was used to measure energy intake, in kilocalories per day, at baseline, 6, and 18 months.²⁹

Informed consent was obtained from all individual participants included in the study. The institutional review board at both sites, the University of North Carolina and the University of Pittsburgh, approved the procedures for this study.

2.3 | Statistical analysis

Descriptive statistics were calculated for demographic variables, physical activity barriers, MVPA, PWL, and PWG across levels of number of children in the home (no children, one child, two children, three or more children). Demographic variables were tested for their association with number of children in the home and PWL/PWG using ANOVA for continuous variables and chi-square tests for categorical variables using the Mantel-Haenszel test for linear association. Significant confounders were included as covariates in the mediation analyses. For descriptive purposes, linear regression models were used to compare physical activity barriers, MVPA, and PWL/PWG at each time point using three dummy-coded variables for one child, two children, and three or more children compared with no children. Each of the two mediation models used the continuous variable for number of children in the home and included only participants with all available data on the variables included in the model. All analyses collapsed data across treatment groups but included a covariate for treatment group.

The PROCESS macro for SAS³⁰ was used to test the two mediation hypotheses. In simple mediation models, the independent variable (IV) is tested for its association with the dependent variable (DV; *c* path), the IV is tested for its association with the mediator (*a* path), and the mediator is tested for its association with the DV, controlling for the IV (*b* path). Then, various methods can be used to test for the significance of the indirect effect (*a*b*), or the effect of the IV on the DV through its effect on the mediator. In contrast to simple mediation, serial mediation models test the effect of an IV on the DV through its effect on two or more mediators in sequence (Figure 1). The PROCESS macro for SAS allows for testing of serial mediation

and tests the significance of multiple indirect effects (all possible indirect paths) without reducing power. PROCESS uses an ordinary least squares regression-based path analytic framework and bias-corrected bootstrapped confidence intervals to evaluate the significance of indirect effects, which are significant when the confidence interval does not include zero.

The first model, termed the *initiation model*, evaluated the association between number of children in the home (as a continuous variable) and initiation of physical activity and PWL at 6 months, whereas the *maintenance model* evaluated the association between the number of children in the home and physical activity changes and weight regained from 6 to 18 months. In the initiation model, the IV was number of children in the home, baseline physical activity barriers, and change in MVPA at 6 months were entered as serial mediators, and the DV was PWL at 6 months. In the maintenance model, number of children was the IV, change in physical activity barriers from baseline to 6 months and change in MVPA from 6 to 18 months were serial mediators, and the DV was PWG from 6 to 18 months. All change variables were entered as residualized change scores that controlled for values at the prior measurement point. All models controlled for race, age, marital status, treatment group, and clinic. To determine the effect of activity changes on weight change above and beyond the effect of dietary changes, a separate set of models controlled for dietary intake in kilocalories per day at the same time points (6-month residuals in the initiation model and 6 to 18-month residuals in the maintenance model).

3 | RESULTS

3.1 | Sample characteristics

The baseline characteristics of the study sample by number of children in the home are presented in Table 1. Overall, participants were 70.8% white and 82.0% female, and had an average BMI of 32.9 (± 3.6) at baseline. Age, marital status, and race differed by number of children in the home ($B = -1.47, P = .004; \chi^2_{MH}(3) = 23.2, P < .0001; \chi^2_{MH}(3) = 6.2, P = .01$); in general, participants with more children

were more likely to be younger, married, and in the minority racial group. Therefore, these variables were included as covariates in all models.

A total of 267 participants with complete data at 6 months were included in the initiation model. There were no differences in dropout by 6 months by number of children in the home. At 18 months, 16% of these participants did not complete a weight measurement and 25% were missing MVPA. Across descriptive categories of number of children in the home, 75.1% of participants with no children completed the 18-month assessment, 83.1% of parents with one child, 70.0% of parents with two children, and 52.9% of parents with three or more children. There was a significant linear trend for a difference across categories ($\chi^2_{MH} = 5.24, P = .02$).

3.2 | Baseline physical activity barriers, initiation of physical activity, and 6-month weight loss

The means and standard deviations of variables in each model can be found in Table 2. Compared with participants with no children in the home, participants with one child had greater physical activity barriers at baseline, but there was no difference for parents with two children or three or more children. At 6 months, weight losses for participants with no children, one child, two children, and three or more were 10.8%, 9.3%, 9.7%, and 7.9%, respectively. In bivariate models, the weight loss of adults with three or more children was significantly less than that of nonparents ($P < .05$).

Estimates from the serial mediation models can be found in Figure 1, and the indirect effect estimates and confidence intervals are displayed in Table 3. In the serial mediation model, the total effect (c) between number of children in the home and PWL was significant ($B = 0.82, 95\% \text{ CI}, 0.13-1.52, P < .05$), such that as number of children in the home increased, PWL increased (became more positive, indicating less weight loss). The direct effect (c') between number of children in the home and PWL was no longer significant after accounting for both mediators. The indirect effect of number of children in the home on PWL operating through physical activity barriers at baseline and MVPA change from 0 to 6 months was significant, but was no longer significant when controlling for change in dietary intake from 0 to 6

TABLE 1 Demographic characteristics by number of children in the home and in the randomized sample

Variable	No Children (n = 139)	One Child (n = 49)	Two Children (n = 54)	Three or More Children (n = 25)	Sig.	All Randomized (N = 363)
Age (years) ^a	44.4 \pm 9.6	43.3 \pm 8.5	42.4 \pm 6.4	38.9 \pm 6.4	.004	42.2 \pm 9.0
Gender (% female)	82.7	81.6	77.8	88.0	.96	82.6
Race (% minority)	22.3	36.7	33.3	44.0	.01	31.7
Marital status (% married)	53.2	69.4	81.5	92.0	<.0001	57.9
Education (% college graduate)	56.8	59.2	63.0	60.0	.51	59.3
BMI (kg/m ²) ^a	32.6 \pm 3.7	32.8 \pm 3.1	33.2 \pm 3.7	34.5 \pm 3.3	.03	33.0 (3.6)
Weight (lbs.) ^a	201.3 \pm 31.4	202.3 \pm 32.2	204.5 \pm 33.2	214.7 \pm 34.0	.09	204.6 (32.4)

^aMeans and standard deviations.

TABLE 2 Means across child status for physical activity barriers, physical activity, and weight change

Initiation Model, 6 Months				
Variable	No children (n = 139) Mean (SD)	One child (n = 49) Mean (SD)	Two children (n = 54) Mean (SD)	Three or more children (n = 25) Mean (SD)
Physical activity barriers	35.87 (7.35)	39.49 (9.44) ^{***}	37.28 (7.07)	36.97 (8.71)
Average MVPA min/week				
Baseline	102.3 (233.3)	102.0 (134.5)	86.3 (121.58)	77.34 (93.62)
6 months	251.6 (231.6)	199.0 (183.9)	244.12 (172.1)	149.51 (172.02) ^{**}
Change (6 months-baseline) ^a	149.3 (249.7)	97.0 (222.5) [*]	157.9 (165.6)	72.2 (192.7) ^{**}
PWL 6 months	-10.8 (6.4)	-9.3 (5.6)	-9.7 (6.1)	-7.9 (5.9) ^{**}
Maintenance model, 18 months				
Variable	No children (n = 104) Mean (SD)	One child (n = 40) Mean (SD)	Two children (n = 37) Mean (SD)	Three or more children (n = 16) Mean (SD)
Physical activity barriers				
Baseline	35.25 (7.47)	39.80 (9.64) ^{***}	37.78 (7.10) [*]	37.01 (9.46)
6 months	31.95 (7.85)	34.55 (9.10) [*]	31.59 (6.97)	33.56 (6.98)
Change (6 months-baseline) ^a	-3.30 (8.25)	-5.25 (11.8)	-6.19 (6.81)	-3.45 (10.50)
Average MVPA min/week				
6 Months	267.5 (234.4)	197.6 (173.0) [*]	269.23 (181.87)	185.13 (198.89)
18 months	179.8 (212.1)	142.4 (166.4)	195.7 (172.9)	152.2 (197.2)
Change (18 months-6 months) ^a	-87.7 (189.2)	-55.2 (187.2)	-73.6 (157.3)	-32.9 (141.2)
PWG 6-18 months	20.9 (184.8)	67.5 (162.3)	26.3 (81.0)	74.8 (215.4)

Note. MVPA, moderate-to-vigorous physical activity; PWL, percent weight loss baseline to 6 months; PWG, percent of weight lost at 6 months regained in 6 to 18 months.

^aChange values control for the value at the previous time point through the use of residualized change scores.

^{*} $P < .10$, for significance of linear regression model using dummy variables to compare one child, two children, and three or more children compared with no children.

^{**} $P < .05$, for significance of linear regression model using dummy variables to compare one child, two children, and three or more children compared with no children.

^{***} $P < .01$, for significance of linear regression model using dummy variables to compare one child, two children, and three or more children compared with no children.

TABLE 3 Indirect effects of number of children in the home on PWL and PWG

Mediators (pathway)	Adjusted for Covariates ^a		Adjusted for Covariates and Dietary Intake ^b	
	Est.	95% CI ^c	Est.	95% CI ^c
Initiation model				
Baseline physical activity barriers change in MVPA 0-6 ($a_1d_{21}b_2$)	0.026	0.002-0.081	0.021	-0.0001 to 0.076
Baseline physical activity barriers (a_1b_1)	0.035	-0.003 to 0.456	0.024	-0.033 to 0.149
Change in MVPA 0-6 (a_2b_2)	0.158	-0.039 to 0.376	0.162	-0.040 to 0.381
Maintenance model				
Change in physical activity barriers 0-6 change in MVPA 6-18 ($a_1d_{21}b_2$)	0.003	-0.082 to 0.195	0.0007	-0.125 to 0.154
Change in physical activity barriers 0-6 (a_1b_1)	0.093	-3.023 to 3.704	0.024	-3.309 to 3.402
Change in MVPA 6-18 (a_2b_2)	-0.317	-2.557 to 0.502	-0.318	-2.703 to 0.429

Abbreviations: CI, confidence interval; MVPA, moderate-to-vigorous physical activity; PWG, percent weight regained; PWL, percent weight loss.

^aAnalyses controlled for race, age, marital status, treatment group, and clinic. Change variables entered as residualized change scores from previous value.

^bAnalyses controlled for all covariates above plus dietary intake in kcal/day.

^cIndirect effect is significant when the confidence interval excludes zero.

months. The indirect effects operating through single mediators were not significant.

3.3 | Change in physical activity barriers, maintenance of physical activity, and 6- to 18-month weight regain

In bivariate models, there were no differences in change in physical activity barriers from 0 to 6 months, change in MVPA from 6 to 18 months, or PWG from 6 to 18 months across categories of number of children in the home. In the serial mediation model, the total effect (c) between number of children in the home and PWG was not significant ($B = 10.94$, 95% CI, -19.15 to 41.04 , $P = .47$). There were no significant pathways in the model, and none of the indirect effect pathways were significant. Results were similar when also controlling for dietary intake.

4 | DISCUSSION

This study showed that there was an association between the number of children in the home and the short-term weight loss success of participants in a behavioural weight loss intervention, which was accounted for by greater perceived barriers to physical activity at study entry and in turn, a lower level of MVPA initiation from baseline to 6 months. However, the mediated effect was no longer significant after controlling for changes in dietary intake. The number of children in the home was not associated with changes in perceived physical activity barriers, maintenance of physical activity, or weight regain from 6 to 18 months; though this must be interpreted with caution given the greater likelihood of dropout by 18 months among participants with a greater number of children in the home. Notably, dropout at 6 months did not differ by number of children in the home, and participants both with and without children in the study had clinically significant weight loss at 6 months that would be considered beneficial for weight-related health outcomes. This programme provided a high level of support to overcome individual barriers compared with programmes of lower intensity, which may be one reason why participants with children, regardless of how many, were successful at losing weight.

The full mediation model indicated a significant indirect effect between the number of children in the home on PWL at 6 months operating through the effect of the two serial mediators, physical activity barriers at baseline, and change in MVPA. An increasing number of children in the home was predictive of lower 6-month PWL because of its association with greater physical activity barriers, which in turn were associated with a lower increase in MVPA from baseline to 6 months. Research has suggested that parents may have lower levels of physical activity than nonparents and a higher weight at any given point in time.^{1,10} However, this is the first study to suggest that adults with children in the home who are actively seeking weight loss treatment and who have equivalent levels of activity with nonparents

at study entry may have more difficulty increasing their physical activity to recommended levels because of a greater number of perceived physical activity barriers. As the focus of this paper was on the relationship between having children, exercise barriers, and physical activity, dietary intake was not included in the hypotheses. However, the finding that the indirect effect was no longer significant when controlling for changes in dietary intake may suggest that a greater number of children in the home presents barriers to making dietary changes, which would subsequently affect weight change. In this study, all participants were instructed to gradually increase their physical activity to 300 minutes of MVPA per week and were asked to reduce their calories to 1200 to 1800 per day. While the average MVPA of adults with one or two children at 6 months did not meet programme recommendations, it exceeded the recommendations of the physical activity guidelines and indicates that many of the adults with children in the home were successfully able to make changes in their physical activity during the first 6 months of the programme. However, adults with three or more children had lower increases in activity, which may have affected their weight loss success.

On average, participants regained some of their initial weight that was lost and decreased their MVPA from 6 to 18 months. There was no total or direct effect of number of children in the home on PWG from 6 to 18 months. This is the first study to examine the maintenance of weight and physical activity changes in parents and non-parents, and the results could suggest that the responsibilities and time demands of having children in the home have a greater effect on initiating physical activity and short-term weight loss than they do on maintaining those changes. Given that most participants in the study decreased their physical activity from 6 to 18 months, it is possible that there are factors other than having children in the home that are stronger predictors of the maintenance of physical activity in the long term, such as self-efficacy, screen time behaviours, or previous weight loss success.^{31,32} Notably, because a greater number of children in the home was associated with a greater likelihood of dropout before the 18-month assessment, the results may be biased towards a sample that was motivated to continue through the end of the study.

A strength of this study is that it was the first to use an objective measure of physical activity and serial mediation models to evaluate the physical activity barriers, physical activity changes, and weight changes of adults with and without children during active treatment for weight loss. The majority of the studies examining physical activity in parenthood have used self-report, which tends to overestimate activity levels and has a high degree of measurement error.³³ Objective measures of physical activity are preferred, such as accelerometers or a multisensor device as used in this study. The finding that an increasing number of children in the home may be associated with a difficulty initiating physical activity and short-term weight loss in a behavioural weight loss intervention has important implications for intervention research. In traditional interventions, adults are often asked to attend in-person group meetings, meet a strict caloric goal, increase their physical activity, and self-monitor their calories and activity daily. For adults caring for children, these requirements may be too difficult to fit into a schedule that also includes taking care of

children, food preparation, and transporting children to school or other activities. Interventions designed specifically for families may be warranted, in which parents receive behaviour change recommendations that are designed to accommodate their schedules and reduce their barriers to activity. Alternatively, traditional adult interventions could target content towards parents, such as specific lessons, tailored feedback, and problem solving, which acknowledges the difficulties of making changes under strict demands and encourages them to overcome or reduce their physical activity barriers.

While this study showed that increasing numbers of children in the home are associated with reduced initiation of physical activity and weight loss, a limitation of the study is that participants were not asked to provide the exact ages of children in the home. Some research has suggested that adults with children under the age of five or six may have lower MVPA levels than adults with older children because of the demands of taking care of infants and other young children.¹⁴⁻¹⁶ This remains an important direction for future research. Another limitation of this study is the low number of males in the study sample; however, it is consistent with other studies as males are generally underrepresented in behavioural weight control trials. A salient limitation of the study is the amount of missing data at 18 months and the finding that participants with more children were more likely to drop out before 18 months. This finding is supportive of the hypothesis that participants with more children in the home have greater barriers to programme participation. However, the results of the maintenance model must be interpreted with caution given that the sample of parents with greater numbers of children at 18 months that remained in the study likely had higher levels of motivation, social support, or other resources that enabled their continued participation in the programme, which may also have affected their engagement in physical activity.

Given the benefit of behavioural weight loss programmes to adults with overweight and obesity, it is important to determine the psychosocial predictors of successful behaviour and weight change. This study uniquely contributes to the intervention literature by using temporally based mediation models and an objective measure of physical activity to demonstrate that the number of children in the home is associated with greater physical activity barriers at study entry, and in turn, with reduced MVPA changes and weight loss. This study fills a significant gap in the literature by informing future interventions that may be able to tailor intervention components and strategies to better increase parents' adherence to treatment recommendations.

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CONFLICT OF INTEREST

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and a co-investigator on a grant awarded to the University of Pittsburgh by Weight Watchers International. Dr. Deborah Tate also serves on the Scientific Advisory Board for Weight Watchers International.

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