From the Workplace to Home: The Impact of an Email Intervention Targeting the Family

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Abstract

Background and Purpose: Improved employee health contributes to improved employer outcomes in productivity, attendance and workplace satisfaction. Wellness programs focus on the employee to improve these outcomes, but fail to offer opportunities that include the family. A focus on the employee and their child may yield greater health improvements. This pilot study explored the impact of an e-mail intervention targeting the employee and his/her child on their physical activity level, self-efficacy and social control (SC). **Methods**: Parent and child dyads were recruited from faculty and staff at a university and were subsequently randomized into an intervention group (family-focused activities) or a control group (employee-focused activities). Both parents and children ($n_{dyads} = 19$) completed a baseline and follow-up (10 weeks later) online questionnaire that measured physical activity, self-efficacy, and SC. **Results**: Significant differences in parents were found in task efficacy, scheduling efficacy, and collaborative SC, where the intervention group reported higher changes for these outcomes compared to the control group ($p<0.10$). Changes in collaborative SC reported by children in the intervention group approached significance ($p = 0.13$). **Conclusion**: Findings provide initial support for an e-mail based wellness programs' targeting family-based activities compared to an intervention targeting the employee alone.

Keywords: Parent/child dyads; physical activity; social control; self-efficacy; Internet intervention

Introduction

Many companies implement employee wellness programs in order to keep healthcare costs down and improve the health of their employees (Baker et al., 2008; Pronk & Kottke, 2009). Employees who participate in these programs often show decreased absenteeism, reduced job stress, reduced risk of heart disease, type 2 diabetes, depression, high blood pressure, lower body fat percentage, and more (Pronk & Kottke, 2009; Witt, Olsen, & Ablah, 2013). In addition, a review found that internet based wellness programs can be effective at increasing physical activity among employees (Zacharia, Funck, Alshuwaiyer, Gwin, Taylor, & Branscum, 2013). Although the employee benefits are evident, there is also a compelling need to investigate programs that study the employee's family members, including children (Johnson & Allen, 2013). A review that examined the workplace and family found that of 190 studies performed between 1980-2002, only 1.4% included the child (Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005). An concept that has received little attention is the effect employee wellness programs have to increase the physical activity levels of their employees' children and whether this effect has any added benefits for employees. Given that having healthy and active children are associated with parents' health-related quality of life (Williams et al., 2011), it may be important for employers to target the families of their employees.

Physical activity interventions targeting the family and the child have shown some promising results. In a review of 21 interventions targeting children, interventions that focused on parent and child dyads or the family yielded stronger effects than interventions focusing on the child (Dellert & Johnson, 2014). However, the interventions did not make any comparisons to any parent-focused interventions. One study showed that when parents completed the goal of increasing their

step count in the day, the child did as well (Holm, Wyatt, Murphy, Hill, & Odgen, 2012). In another study, both parents and children in the treatment group increased their physical activity from baseline to post-intervention using educational sessions (Van Allen, Borner, Gayes, & Steele, 2014). These studies provide evidence that family-based interventions can be an effective way of increasing a child's physical activity level, and as well as the parent's physical activity level.

Social cognitive theory (SCT) is often used to inform studies related to health behaviors as it includes descriptions of personal, environmental, and behavioral factors (Bandura, 1986), all of which are assessed in our pilot study. The application of SCT has been used to guide school-based physical activity interventions (Dishman, Motl, Saunders, Felton, Ward, Dowda, & Pate, 2004). Within SCT, self-efficacy is suggested to be a key predictor of behavioral change (Bandura, 2004; Valois et al., 2008). Self-efficacy interventions are successful in increasing physical activity (Ashford, Edmunds, & French, 2010; Williams & French, 2011) and changes in self-efficacy are frequently examined as part of employee wellness programs (Schopp, Bike, Clark, & Minor, 2015), school-based interventions (Dishman et al., 2004) and family-based interventions (Rutkowski & Connelly, 2012).

In addition to examining self-efficacy, an environmental factor that may impact a child's physical activity is social control from a parent (Wilson & Spink, 2011). Social control is a regulatory type of influence where one individual prompts or persuades another to perform a desired behavior (Lewis & Butterfield, 2005; Wilson & Spink, 2011). For example, when a parent wants his/her child to increase physical activity participation, the parent may offer to go out and play with their child. In a study by Wilson and Spink (2010), they found that adolescents reported higher ratings of behavior change with parental use of positive social control, with collaborative social control showing the strongest relationship with behavior change. In another study, adolescents reported more activity change when collaborative and positive social control was used by their parents (Wilson & Spink, 2011).

The purpose of this study was to investigate the impact of an email parent-child dyad intervention using SCT and social control in the work setting. Specifically, changes of the employee and his or her child(ren) in physical activity levels, self-efficacy, and social control use by parents. It was hypothesized that the employee and children in the family-focused group would have a greater increase in physical activity and mediators (self-efficacy and social control) than the employee-focused group. Though both employee groups were expected to have increases in physical activity, it was hypothesized that the family-focused group would have a greater increase as a result of the employee-child interactions. Lastly, an exploratory purpose of the intervention was to identify if it was linked to lower rates of absenteeism and job-related stress.

Methods

Participants

Participants included faculty and staff from a local university who were recruited to participate in an email-based workplace wellness program. Recruitment was primarily conducted via emails sent to department chairs, individual faculty and forwarded on from other faculty. A total of 1,114 emails were sent directly to faculty with 270 faculty responding to the email (24.2% response) and 59 expressing interest in the study (5.3% of initial 1,114 emails; 21.9% of responders; See Figure 1). Additional methods included flyers and posters around campus. Inclusion criteria were being a parent and having at least one child between the ages of 8 and 17 who was willing to participate in the study. The age was chosen due in part to the physical activity questionnaire, which has a minimum age of 8 years old, and this study sought an age range where children may begin developing their own regulatory skills. There were a total of 59 interested eligible employees who received the email to the first questionnaire, with 30 parents and 32 children who participated in the baseline questionnaire. In an attempt to increase our sample size, we encouraged participants to

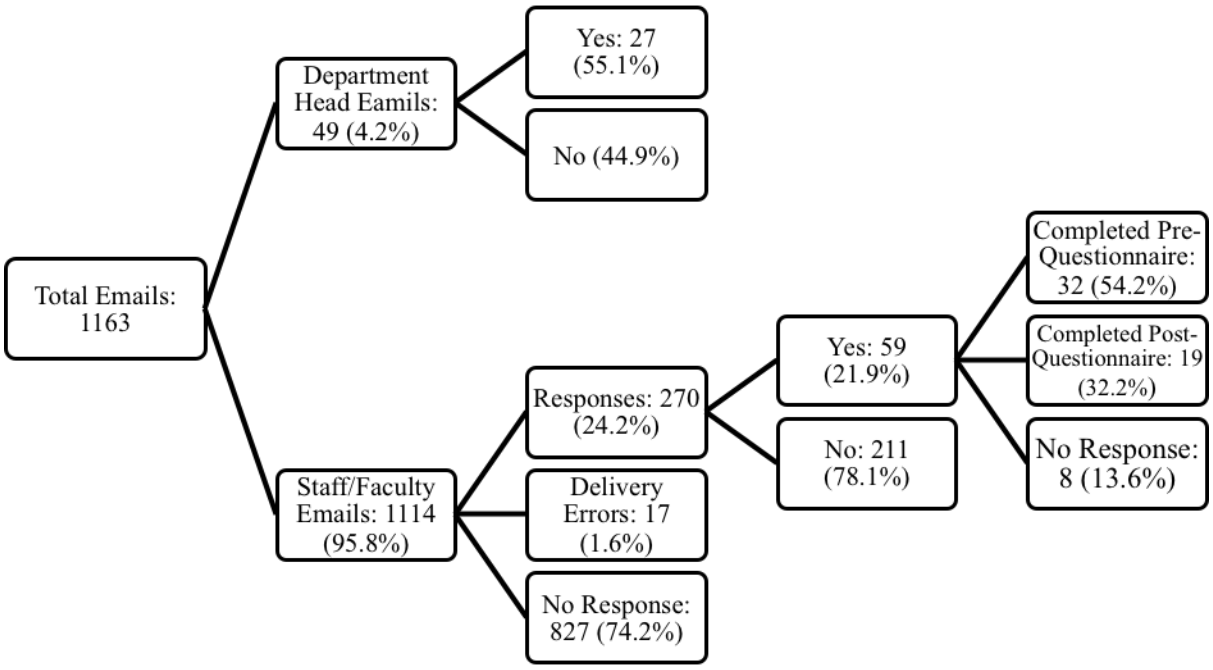
invite their colleagues, friends, and family through email to participate in this study using a provided recruitment message. These individuals who were recruited through a participant needed to meet the same inclusion criteria. Of those parent/child dyads that completed the baseline questionnaire, 19 dyads completed the follow-up questionnaire (59.4% completion rate). Those assigned to family-focused group were more likely to finish the program with a dropout rate of 28.6% (p = 0.22), compared to the employee-focused group with a dropout rate of 50%. Of those 19 who completed, three of those dyads were recruited from outside of the original university in the additional recruiting.

Procedures

The Institutional Review Board of the university where the pilot study was conducted gave approval to this study prior to recruitment and data collection. Interested faculty and staff were sent a link to an online survey that included consent forms for parent and child, and an assent form for the child, followed by the baseline questionnaire. Both parents and children completed questionnaires at baseline (Week 0) and following the intervention (Week 10). All questionnaires were administered through surveymonkey.com and took approximately 20 minutes to complete. This study was designed to be during a school semester, which a 10-week study was used to avoid high-stress times such as finals.

Figure 1

Email Recruitment Flow Chart.



Following the baseline assessment, parent-child dyads were randomized into either a family-focused group (intervention) or an employee-focused group (control). Randomization was achieved by assigning participants a code and then through a random number generator in Microsoft Excel the participants were classified to either the family-focused group or employee-focused group. Both groups were sent weekly activities via the employees' email over a 10-week period. The activities selected were developed to directly target the components of SCT including knowledge, self-efficacy, outcome expectations, goals, and social structural factors. Specific topics were chosen to direct activities which include: weekly schedule, goal setting, physical activity exploration, self-monitoring physical activity calendar, barriers and solutions, goals check-in, physical activity benefits, neighborhood evaluation, inviting others to join in physical activity day, and reflection and future plans. The family-focused group received information and activities that were designed for the employee to interact with his or her family in order to complete the activities (e.g., set a goal as a family). The employee-focused group received information and activities designed only for the employee to complete and no direction to include the family (e.g., set a goal for him/herself). All of the activities were designed to target self-efficacy (both interventions) and social control (family-focused intervention only). In the family-focused group, the parents were encouraged to discuss physical activity and be active with their children targeting positive and collaborative social control.

Measures

Physical Activity Level

Physical activity was assessed for adults by the Physical Activity Questionnaire for Adults (PAQ-AD), (Copeland, Kowalski, Donen, & Tremblay, 2005) and for youths using the Physical Activity Questionnaire for Older Children (PAQ-C), (Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997; Kowalski, Crocker, & Faulkner, 1997). The PAQ questionnaires provided knowledge of the type of activity, intensity, and frequency of physical activity through a 7-day self-reported recall. Responses are summarized on a 5-point Likert scale where 1 indicates low physical activity level and a 5 indicates a high physical activity level (Copeland et al., 2005; Kowalski et al., 1997). These questionnaires show acceptable test - retest reliability ranging from .53 to .64 for adults (Copeland et al., 2005) and .75 to .82 for youth (Kowalski et al., 1997).

Self-Efficacy

Parent self-efficacy was measured using a 10-item questionnaire developed by Rodgers and Sullivan (2001) that assessed three types efficacy: coping (3 items), task (4 items), and scheduling (4 items). All responses were assessed on a 11-point Likert-type scale from 0 (no confidence) to 100% (complete confidence). A sample question from the coping subscale is "How confident are you that you can exercise when you…are tired." Rodgers, Wilson, Hall, Fraser and Murray (2008) provided support for the validity of this measure through confirmatory factor analyses of two separate samples as well as discriminant validity by distinguishing between the exercisers and non-exercisers. Reliability of the scale has been established using internal consistency of the items with Cronbach alphas of at least 0.81 (Rodgers et al., 2008). Child self-efficacy was measured with an eight item questionnaire, originally developed by Saunders and colleagues (1997), rated on a five-point scale ranging from disagree a lot to agree a lot. A sample item is "I can be active on most days even if I could watch TV or play video games instead." The reliability of this scale has been established by using internal consistency of the items with a Cronbach alpha of $\alpha = 0.79$ (Dishman, Motl, Sallis, Dunn, et al., 2005). Additionally, this scale showed acceptable validity as it has been related to physical activity in youth (Dishman, Saunders, McIver, Dowda, & Pate, 2013). Self-efficacy Cronbach alphas were at acceptable levels in this study (0.7 to 0.9), with the exception of task self-efficacy for the parent at baseline (0.6).

Social Control

Parent and child social control were assessed by using three subscales, (positive (4 items), collaborative (3 items), and negative (2 items)),

which will provide clarity of the types of regulatory influences parents use and children perceive to influence behavior change (Wilson & Spink, 2011; Wilson, & Spink, 2012). An example item for collaborative social control was: Offered to be active with you {your child}. Each item was measured using a scale from 1 (never) to 7 (frequently). This scale has been used both in parents (Wilson, & Spink, 2012) and children (Wilson & Spink, 2011) previously and demonstrated acceptable internal consistency based on Cronbach alpha values above .71. Cronbach alphas were at acceptable levels in this study for all social control measures (0.7 to 0.9).

Worksite-related Questions

A questionnaire targeting worksite wellness was also included to measure changes in absenteeism, presenteeism, and stress. Parents were asked open-ended questions regarding the number of sick days he or she took over the past semester. In addition to this, parents were asked on a scale from "not at all" to "majority of time": "While at work, how often do you find yourself performing a task that is not work related?" to assess presenteeism. Lastly, on a scale from very low to very high, including not applicable, parents were asked, "Please rate how stressful your job is" to assess job stress. These items were developed for this study.

Intervention Implementation Questions

Lastly, questions were included to assess the efficacy and implementation of this intervention. Parents were asked questions about their behaviors including: reading the emails, completing activities, and identifying activities performed. Responses to this set of questions were used to explore the implementation of the intervention and will help improve the intervention and compliance in our future work.

Data Analysis

In order to accomplish our goal of this pilot study we used an experimental design, with an alpha level of 0.10 due to low sample size. The dependent variables measured for both parents and children were physical activity level, self-efficacy toward physical activity, and social control. An analysis of 2 (time) x 2 (group) mixed model ANOVAs, plus percent changes from pre- and post- measures were used for effect size. Statistical Package for the Social Sciences (SPSS) version 20.0 was used to analyze data.

Results

Participants

Participants were 32 families who completed the baseline questionnaire. The majority of parents were female (n = 24, 80%) and white (n = 22, 73%), with an average age of 43.3 years old (SD = 4.9; see Table 1 for frequencies). For the children, there was an even split of male (n=17) and female (n=15) participants. The majority of the children were white (n = 23, 71.9%), with a mean age of 11.5 years (SD = 2.0, *Range:* 8-15 years). The family-focused and employee-focused groups did not differ on any demographic variables, and physical activity variables at baseline (See Table 1 for means). A comparison of those who completed versus those who did not complete the study did not differ in demographic variables, physical activity, self-efficacy, social support and social control (ps>0.10; see Table 2). There appeared to be more married parents who completed the study than single parents, though this result only approached significance (p=0.13).

Intervention Implementation Questions

Participants were asked to reveal how many activities they attempted or completed. Only 10 out of 19 participants responded to this question and of that, 70% completed 7 or more activities (see Table 3). With the exception of one activity, the top nine activities identified were ones included in the intervention from a mixed list of activities that were either part of or not part of the study. Overall, these questions reveal that participants may have read the emails and were able to recognize the activities but challenges may have occurred performing the activities.

Table 1

Demographic Characteristics at Baseline

Parent	Total *N*=30	Family-Focused *n*=14	Employee Focused *n*=16
	N (%)	n (%)	n (%)
Gender			
Female	24 (80.0%)	13 (92.9%)	11 (68.8%)
Male	6 (20%)	1 (7.1%)	5 (31.2%)
Ethnicity			
Asian/Pacific Islander	2 (6.7%)	2 (14.3%)	0 (0%)
Black/African American	3 (10.0%)	2 (14.3%)	1 (6.3%)
Latino/Hispanic	3 (10.0%)	1 (7.1%)	2 (12.5%)
White	22 (73.3%)	9 (64.3%)	13 (81.2%)
Multi-Racial	0 (0%)	0 (0%)	0 (0%)
	M (SD)	M (SD)	M (SD)
Age (years)	43.3 (4.9)	43.8 (5.1)	42.9 (5.0)
Physical Activity Level	2.1 (0.45)	2.1 (0.40)	2.1 (0.49)
Child	N=32	n=14	n=18
	N (%)	n (%)	n (%)
Gender			
Female	15 (46.9%)	5 (35.7%)	10 (55.6%)
Male	17 (53.1%)	9 (64.3%)	8 (44.4%)
Ethnicity			
Asian/Pacific Islander	1 (3.1%)	1 (7.1%)	0 (0%)
Black/African American	3 (9.4%)	2 (14.3%)	1 (5.6%)
Latino/Hispanic	3 (9.4%)	0 (0%)	3 (16.7%)
White	23 (71.9%)	9 (64.3%)	14 (77.8%)
Multi-Racial	2 (6.3%)	2 (14.3%)	0 (0%)
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
Age (years)	11.5 (2.0)	12 (2.1)	11.1 (1.9)
Physical Activity Level	2.9 (0.5)	2.9 (0.4)	2.8 (0.5)
	Frequency (%)	Frequency (%)	Frequency (%)
Completed	19 (59.4%)	10 (71.4%)	9 (50.0%)
Dropped Out	13 (40.6%)	4 (28.6%)	9 (50.0%)

* Two participants had more than one child participate

Table 2

Differences in Means (SD) on Baseline Measures Between those who Completed versus Dropped Out of the Intervention

	Completed		Dropped Out	
	Parent (N = 19)	Child* (N = 19)	Parent (N = 11)	Child* (N = 13)
Physical Activity	2.1 (0.4)	2.9 (0.4)	2.1 (0.5)	2.8 (0.6)
Self-Efficacy		4.2(0.6)		4.5 (0.5)
Task	89.1 (10.1)		91.8 (9.6)	
Coping	66.7 (16.9)		70.9 (18.3)	
Scheduling	70.9 (16.3)		71.5 (24.0)	
Social Control				
Positive	5.5 (1.3)	5.4 (1.6)	5.5 (1.3)	5.7 (1.5)
Collaborative	4.4 (1.5)	4.5 (1.5)	4.4 (1.2)	4.6 (1.9)
Negative	2.8 (1.5)	3.1 (2.1)	2.4 (1.8)	3.1 (1.9)
Age	43.8 (5.3)	11.6 (2.0)	41.8 (4.4)	11.2 (2.1)
Gender				
Female	15 (50%)	7 (21.9%)	9 (30%)	8 (25.0%)
Male	4 (13.3%)	12 (37.5%)	2 (6.7%)	5 (15.6%)
Ethnicity				
Asian/Pacific Islander	1 (3.3%)	1 (3.1%)	1 (3.3%)	0 (0.0%)
Black/African American	2 (6.7%)	2 (6.3%)	1 (3.3%)	1 (3.1%)
Latino/Hispanic	2 (6.7%)	2 (6.3%)	1 (3.3%)	1 (3.1%)
White	14 (46.7%)	13 (40.6%)	8 (26.7%)	10 (31.3%)
Multi-Racial	0 (0%)	1 (3.1%)	0 (0%)	1 (3.1%)
Relationship Status				
Single	0 (0%)		2 (6.7%)	
Married	18 (60%)		9 (30%)	
Other	1 (3.3%)		0 (0%)	

*Two parents had two children participating.

Changes in Outcomes

Physical Activity

The factorial ANOVA for parent physical activity indicated that the time by group interaction was not significant for physical activity in parents, $F_{(1,18)} = 0.64$, $p = 0.43$, $\eta^2 = 0.04$ (see Table 4 for means). Similarly to parents, children showed no significant time by group interaction for physical activity ($F_{(1,17)} = 0.03$, $p = 0.88$, $\eta^2 = 0.001$).

Self-efficacy

Results revealed parents had a significant time by group interaction for task efficacy ($F_{(1,18)} = 3.94$, $p = 0.06$, $\eta_p^2 = 0.18$) and scheduling efficacy ($F_{(1,18)} = 6.67$, $p = 0.02$, $\eta_p^2 = 0.27$).

Table 3

Parents' Recall of Activities Included in Intervention

	Overall (*N*=19)	Family-Focused (*n*=11)	Employee-Focused (*n=8)*
Activity	n (%)	n (%)	n (%)
Weekly Schedule*	17 (89.5%)	9 (52.9%)	8 (47.1%)
Barriers and Solutions*	16 (84.2%)	9 (56%)	7 (44%)
Goal Setting*	16 (84.2%)	8 (50%)	8 (50%)
Neighborhood Evaluation*	13 (68.4%)	6 (46.2%)	7 (53.8%)
Goals Check-in*	12 (63.2%)	5 (41.7%)	7 (58.3%)
Physical Activity Calendar*	12 (63.2%)	5 (41.7%)	7 (58.3%)
Physical Activity Exploration*	11 (57.9%)	6 (54.5%)	5 (45.5%)
Physical Activity Benefits*	10 (52.6%)	4 (40%)	6 (60%)
Reflection and Future*	10 (52.6%)	4 (40%)	6 (60%)
Physical Activity at Work	7 (36.8%)	1 (14.3%)	6 (85.7%)
Physical Activity Program Creation	6 (31.6%)	2 (33.3%)	4 (66.7%)
Daily Physical Activity Map	5 (26.3%)	3 (60%)	2 (40%)
New Physical Activity Location Search	5 (26.3%)	1 (20%)	4 (80%)
Social Physical Activity Day*	4 (21.1%)	1 (25%)	3 (75%)
Physical Activity Research	3 (15.8%)	1 (33.3%)	2 (66.7%)
Friend Physical Activity Competition	2 (10.5%)	0 (0%)	2 (100%)

*Actual Activity; *n*=19

Post-hoc analysis of task efficacy indicates that the family-focused group had a positive percent change (5.2%, $p = 0.04$) as compared to the employee-focused group who had no change (-1.8%, $p = 0.48$). Scheduling efficacy had a larger disparity between the two groups with the employee-focused group showing non-significant negative percent change (-6.6%, $p = 0.26$) where the family-focused group had a large positive percent change (13.9%, $p = 0.02$; see Table 5 for means). Coping efficacy did not show a significant time by group interaction effect ($F_{(1,18)} = 0.46$, $p = 0.51$, $\eta_p^2 = 0.03$), meaning that these individuals did not feel more prepared to perform physical activity outside of normal circumstances. Child reports of self-efficacy showed no significant time by group interaction effect for self-efficacy ($F_{(1,17)} = 0.79$, $p = 0.39$, $\eta_p^2 = 0.04$).

Social Control

For the parents, there was a significant time by group interaction for collaborative SC, $F_{(1,18)} = 5.55$, $p = 0.03$, $\eta_p^2 = 0.24$. Post-hoc analyses indicated that the family-focused group showed an increase in use of collaborative SC (10.2%, $p = 0.06$) compared to a no change in the employee-focused group (-8.8%, $p = 0.21$; see Table 5 for means). Unlike the parent responses, the child's perceptions of collaborative SC the time by group interaction approached significance ($F_{(1,17)} = 2.54$, $p = 0.13$, $\eta_p^2 = 0.13$) and showed the same pattern as the parents.

Table 4

Summary of Outcomes including Means (SD)

	Family-focused			Employee-focused		
	Time 1	Time 2	% Change	Time 1	Time 2	% Change
Parent						
Physical Activity	2.0 (0.4)	2.2 (0.4)	8.5%	2.1 (0.4)	2.2 (0.4)	2.8%
Self-Efficacy						
Task Efficacy	86.8 (11.8)	91.4 (8.2)	5.2%*	93.1 (6.7)	91.4 (12.0)	-1.8%
Coping Efficacy	61.5 (19.3)	62.4 (21.9)	1.5%	73.0 (9.9)	70.4 (12.6)	-3.6%
Scheduling Efficacy	70.0 (15.9)	79.7 (16.6)	13.9%*	73.3 (17.2)	68.5 (16.9)	-6.6%
Social Control						
Positive SC	5.3 (1.5)	5.1 (1.0)	-2.3%	5.8 (1.1)	5.1 (1.5)	-11.3%
Collaborative SC	4.2 (1.2)	4.6 (1.0)	10.2%*	4.7 (1.9)	4.3 (1.4)	-8.8%
Negative SC	2.9 (1.8)	3.0 (1.1)	5.3%	2.8 (1.2)	2.8 (1.5)	1.8%
Sick Days	0.3 (0.5)	0.6 (0.9)	69.7%	0.4 (0.5)	0.9 (1.1)	100.0%
Presenteeism	2.2 (0.7)	2.1 (0.6)	-5.0%	2.3 (0.8)	2.3 (1.0)	0.0%
Job Stress	4.2 (0.7)	3.4 (0.7)	-18.5%	4.3 (0.5)	3.4 (1.0)	-20.1%
Child						
Physical Activity	2.9 (0.5)	2.9 (0.5)	2.1%	2.9 (0.4)	2.9 (0.5)	0.7%
Self-Efficacy	4.0 (0.5)	4.1 (0.7)	0.5%	4.4 (0.8)	4.1 (0.7)	-7.5%
Social Control						
Positive SC	5.0 (1.7)	5.1 (1.8)	2.0%	5.8 (1.4)	4.9 (1.6)	-15.3%
Collaborative SC	4.3 (1.2)	5.0 (1.4)	17.8%	4.7 (1.8)	3.9 (2.0)	-15.9%
Negative SC	3.1 (2.3)	2.9 (1.9)	-6.6%	3.1 (2.0)	2.6 (1.9)	-16.3%

* Significant: $p \leq 0.10$; Social Control (SC)

Children in the family-focused group indicated that they perceived their parents used more collaborative SC although not significant (17.8% change, $p = 0.58$), whereas the employee-focused group showed less collaborative SC use although non-significant -15.9% change ($p = 0.18$). For both parents and child reports, there were no significant time by group effects for positive SC (Parent: $F_{(1,18)} = 0.80$, $p = 0.38$, $\eta_p^2 = 0.04$; Child: $F_{(1,17)} = 2.14$, $p = 0.16$, $\eta_p^2 = 0.11$) and negative SC (Parent: $F_{(1,18)} = 0.02$, $p = 0.88$, $\eta_p^2 < 0.001$; Child: $F_{(1,17)} = 0.07$, p = 0.79, $\eta_p^2 = 0.00$).

Worksite-related Outcomes

The number of sick days reported by parents showed no significant time by group interaction, $F_{(1,14)}=0.21$, $p=0.66$, $\eta_p^2=0.02$ and no significant effect over time for reported sick days by the parents ($F_{(1,14)}=2.07$, $p=0.17$, $\eta_p^2=0.13$). Presenteeism ratings (staying on task) also showed no significant interaction ($F_{(1,14)}=0.24$, $p=0.64$, $\eta_p^2=0.02$). Lastly, both groups reported significant decreases in job stress over time during the intervention with the family-focused group reporting a -18.5% change and the employee-focused group reporting a -20.1% change ($F_{(1,14)}=33.39$, $p<0.001$, $\eta_p^2=0.71$). Though there was no significant group by time interaction for job stress ($F_{(1,14)}=0.08$, $p=0.78$, $\eta_p^2=0.01$).

Discussion

This study demonstrated the potential for a workplace health improvement program to improve the physical activity levels of

employees and their families. Several challenges were evident including recruitment and retaining participants in this study. There were 1,114 faculty emails sent regardless of whether the recipient had children or not. As such, many individuals receiving the initial email recruitment likely did not meet the inclusion criteria of having a child in the specified age range and may not have expressed interest in the study. Additionally, both parents and their children needed to agree to participate, which may have led to a lower response rate. Of the 59 (5.3%) who indicated interest, only 54.2% completed the baseline questionnaire. A study similar to ours also demonstrated a low percentage of participants (32%) continuing in the study after receiving the initial information (Liebreich, Plotnikoff, Courneya & Boule, 2009).

Although not an initial aim of our study, we chose to investigate the differences between those who completed the study and those who did not. Our retention rate of 32% completing the post-questionnaire was lower than other Internet interventions delivered in the workplace, which were found to have retention rates from 48.6% - 87% in a systematic review (Zacharia et al., 2013). By delivering activities only through email once a week and not requiring them to be turned in more frequently, participants may have felt disconnected from the study enabling them to forget about participation or to ignore it. In addition, not collecting activities made it difficult to see where participants were dropping out during the study. Also, accountability was limited for the participants to complete the activities. Of note, a higher retention rate was seen in the family-focused group when compared to the control group, the added involvement of the children may have enhanced the retention through potentially providing accountability and/or support.

Changes in Physical Activity, Self-Efficacy and Social Control

As discussed earlier, the hypothesis that the family-focused group would have significantly greater changes over time than the employee-focused group across all constructs was partially supported as significant changes were seen in parent task and scheduling efficacy, as well as collaborative social control. Positive changes were more frequently observed in all the measures in the family-focused group, where the employee-focused group had mainly negative changes. The focus of this intervention was to increase both an employee's physical activity level and their child's. Unfortunately, there were no significant differences in physical activity between family- and employee-focus groups for both adults and children. Participants did not receive any face-to-face contact which, as stated previously, may have led to a "disconnect" or "out of sight; out of mind" mentality and the resulting lack in outcomes. Previous Internet-based physical activity interventions offered an in-person component by offering support classes, discussion sessions, or biometric screenings (Haines et al., 2007; Motl et al., 2011; Touger-Decker, 2010). Having an individual present in a face-to-face environment could potentially allow participants to feel more attached to the study and, in turn, to be more engaged. Lastly, the use of self-reported physical activity versus the use of an objective measure such as an accelerometer, may not be as sensitive to change because individuals often times will over-report report physical activity (Prince et al., 2008).

Another key outcome of this study was self-efficacy of both the parent and the child. For parents, both task and scheduling efficacy were found to have a significant time by group interaction. These changes suggest that parents in the family-focused group increased their perceptions of confidence when performing physical activity and scheduling physical activity over the course of the intervention, while those in the employee-focused group did not. Additionally, identifying goals with their child may have pushed parents to want to appear more successful in their child's eyes. This may be similar to an effect observed between spouses, where if one spouse changes a health behavior it can lead to a positive change in the behavior in the other spouse (Falba & Sindelar, 2008; Wilson, 2002). While parents showed an improvement in self-efficacy, the child reports of self-efficacy did not show any significant

differences. This may have been the result of children not deviating from their normal routine or parents attempting to incorporate themselves more in the child's current physical activity schedule, rather than adding additional times. Alternatively, most of the children were efficacious at the start (above 4 on a 5 point scale), which may have led to a ceiling effect and limited the ability for any change in confidence to occur (Wang, Zhang, McArdle, & Salthouse, 2008).

Another outcome of this study examined changes in social control. One finding of the current study was that collaborative social control, an influence requiring the action of both the parent and child, improved in the family-focused group but not the employee-focused group. Given the family-focused group involved activities done by both the parent and the child, it is not surprising that this type of social control improved. This finding is encouraging because previous literature has found that collaborative social control is related to increased physical activity in children (Wilson & Spink, 2010; Wilson & Spink, 2011). This trend provides support that an email intervention can be used to change how parents may interact with their child through collaborative social control. The change observed in collaborative SC in this pilot study is the first to suggest that an intervention can change parents' use of social control. Although collaborative social control is associated with physical activity change in correlational studies (Wilson & Spink, 2010; Wilson & Spink, 2011; Wilson et al., 2010), the change observed in our intervention did not translate into changes in physical activity. We hypothesize that is due to the relatively short intervention and/or the assessment of physical activity as described earlier (Haines et al., 2007, Motl et al., 2011, Prince et al., 2008).

Lastly, this study included exploratory questions relating to the workplace in which all of these measures besides job stress, had no significant differences. After analyzing the completion dates of the post questionnaires, we found that 12 out of 19 questionnaires were completed during winter break or after spring semester. This typically means that these individuals were on vacation and did not have the typical workload they would have during the semester. This significant result may be due to decreased stress due to vacation rather than the intervention.

Strengths and Limitations

A major strength of this study is the utilization of parent/child dyads. Our study was the first that had both the parent and the child provide reports of all of the same measures within an employee wellness program context. This allowed us to not only compare data between parent or child groups but it allowed analyzation and comparison of differences between parent and child reports. Another strength of this study was that participants were "blinded" to the distinction between the two groups and thought they were participating in a study on effects of a workplace wellness program on children of employees.

The major limitation of this pilot study was that the statistics were underpowered due to a small sample size with only 19 dyads completing the study. As such, data presented here may be less reliable than a study that achieved adequate power for all statistics (Faul, Erdfelder, Buchner, & Lang, 2009). Furthermore, the changes in constructs over time should be interpreted with caution. The low sample size may have been a result of the recruitment process, and all communication being done through email and the challenge of identifying participants who meet the study inclusion criteria.

Finally, another limitation of this study was that a 10-week program may have been too brief of an intervention to show differences in the variable of physical activity. Much of the previous literature used a minimum 12-week intervention (Haines et al., 2007; Hatchett et al., 2013; Motl et al., 2011). Further, another limitation may be in the assessment of physical activity using questionnaires and not objective measures. Given the delivery of the intervention via email, objective measures were not thought to be appropriate. However, the variability in the responses on the PAQ-AD and PAQ-C measures

may not have been sufficient to reveal differences in activity.

Future Directions

Several directions for future research have resulted from this pilot study. First, this study showed promising results in terms of self-efficacy and social control. These findings should be replicated with a larger sample size. Future research may consider a change in the delivery method of the activities such as using either a website or a smartphone application. This method could make activities more interactive, or may make it easier to look at prior activities that were completed, as has been documented in a recent systematic review (Stephens & Allen, 2013).

More studies are needed to understand how an email based employee wellness program can affect the employees' and their child's physical activity and other mediating factors. As interested researchers in providing wellness programs that improve both the employee and their family's health, we will continue to collaborate with employers to examine their workplace and the level of health of their employees.

Conclusion

In this pilot study, several changes were noted that support our hypothesis. Parents in the intervention group increased task and scheduling efficacy, and collaborative social control more than the control group. Overall, this study highlighted an employee wellness programs' ability to affect behavior change in the family and the necessity to perform more research to explain how these programs can impact both the employee and their family.

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