Factors Affecting Adherence to an 18 Week Running Program for Women

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Dedication

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Introduction

Physical and psychological benefits of physical activity have long been established (Pate, Pratt, Blair, & Haskall, 1995). This knowledge has led to recommendations by the Centers Disease Control (CDC), the American College of Sports Medicine (ACSM), and the American Heart Association (AHA) regarding adequate levels of physical activity for all adults (Haskell, Pate, I-Min, & Powell, 2007; Pate, Pratt, Blair, & Haskell, 1995). Specifically, adults should engage in 30 minutes or more of moderate physical activity at least 5 days per week. This activity can be in one continuous 30 minute bout or be accumulated through bouts of 10 minutes or longer throughout the course of the day (Haskell et al., 2007). The AHA and ACSM further argue a "dose response" to physical activity, suggesting that in order to improve one's level of fitness, reduce risk for chronic disease, and prevent unhealthy weight gain, Americans should exceed these minimum recommendations. Unfortunately, the majority of American adults are not acquiring the minimum recommended amount of physical activity. Recent studies suggest that 79% of Americans are acquiring less than 25 minutes of moderate physical activity on a daily basis (Metzger et al., 2008). Accelerometer data from 3462 participants in the 2003-2004 NHANES study indicate that 34% of the population gets 5.3 minutes or less of physical activity per day (Metzger et al., 2008). A similar accelerometer study demonstrated that fewer than 5% of American adults adhered to recommendations to accumulate 30 minutes of physical activity most days of the week (Troiano et al., 2007).

Mothers of young children are at particular risk for inactivity. There is a negative relationship between parenthood and level of physical activity. Results indicate that mothers exercise 34% less than childless women (Bellows-Riecken & Rhodes, 2008). One portion of the Australian Longitudinal Study on Women's Health identified several factors that influence physical activity among mothers (Brown, Mishra, Lee, Bauman, & others, 2000). For example, young married mothers who report "home duties" as their occupation engage in the least amount of physical activity (Brown et al., 2000). This is particularly concerning given parental physical activity behaviors can influence their children's physical activity levels (Gustafson & Rhodes, 2006).

Several studies have examined factors that help individuals to adopt and maintain physical activity (Bock, Marcus, Pinto, & Forsyth, 2001; Miller, Trost, & Brown, 2002; Williams et al., 2008). For example, self-efficacy for physical activity has emerged as an important factor in the adoption and adherence to a physical activity program (Bandura, 2004). Self-efficacy is one's confidence that he or she can engage in physical activity despite barriers such as time, weather, and cost. Additionally, social support from family members and friend is an important factor for predicting physical activity adoption (Carron, Hausenblas, & Mack, Diane, 1996a; Huberty et al., 2008; Kaewthummanukul, Brown, Weaver, & Thomas, 2006). Finally, group cohesion for individuals participating in group-based physical activity has also been shown to be an important factor for exercise adherence (Burke et al., 2005; Estabrooks & Carron, 2000; Spink & Carron, 1992, 1993).

Social Cognitive Theory

"Social cognitive theory (SCT) specifies a core of determinants, the mechanism through which they work, and the optimum ways of translating this knowledge into effective health practices" (Bandura, 2004, p.144). There are five core determinants in SCT, which include the following: (1) Knowledge of health risks and benefits; (2) perceived self-efficacy, (3) outcome expectations (i.e., what one expects from a behavior change and how much they value that expectation), (4) health goals including plans and strategies for achieving these goals; and (5) perceived facilitators and impediments of change (Bandura, 2004). Bandura states that self-efficacy is the central determinant due to its direct effects on health behavior and its ability to affect other determinants (Bandura, 2004).

One's level of personal self-efficacy is central to their ability to create personal change. It is only with a strong level of self-efficacy that one can move forward with motivation and action (Bandura, 2004). Bandura states that one's level of self-efficacy has a direct effect on how one will react and respond to challenges (Bandura, 1977). A strong level of self efficacy relates to higher levels of coping behaviors and higher levels of effort and resilience in the face of obstacles and negative experiences (Bandura, 1977).

Bandura (1997) further explains self-efficacy by describing the four main sources (Bandura, 1977). The first and most influential source is performance accomplishments. Previous success increases ones feeling of mastery or his/her ability to master a goal or task. If mishaps happen early in the overall experience, the negative effect on self-

efficacy is much greater than if those mishaps occur after a few successful experiences. The second source of self-efficacy is vicarious experience. Seeing others successfully accomplish a goal or task raises the observers' level of self-efficacy. This lends itself to the belief that if one works hard and focuses he or she can accomplish a similar goal. The third source is verbal persuasion, telling someone they are capable of dealing with the stress to come. Bandura suggest that this is the most widely used source due to its ease and immediacy. However, verbal persuasion is not the most effective due to the fact that it is not one's own personal experience. The fourth source of self-efficacy is emotional arousal. People pay attention to how they are feeling during the event to help determine how well they accomplished the task. Bandura also postulates that individuals evaluate their accomplishments based on effort or ability. Bandura goes on to illustrate this by stating that accomplishment with minimal efforts encourages self-efficacy while success through significant effort implies a lesser ability and has a smaller effect on self-efficacy.

A meta analysis of thirty eight studies conducted between 1998 and 2000 examining correlates of physical activity and psychological, cognitive and emotional factors found that self-efficacy for exercise is the most consistent correlate of physical activity behavior (Trost, Owen, Bauman, Sallis, & Brown, 2002). One study to demonstrate this, The Women and Physical Activity Survey (Eyler et al., 2003), was a sub study of a much larger, Women's Cardiovascular Health Network Project. The Women and Physical Activity Survey examined the physical activity habits of thousands of women. This was a multi-site survey of thousands of women from diverse racial

background. Women were divided into three categories including the following: (1) Women who met CDC recommendations for physical activity (30 minutes a day 5-7 days per week) (2) women who were insufficiently active; (3) women who were inactive. Results from this study indicate that again, the most consistent predictor of one's physical activity level was their level of self-efficacy for exercise. The researchers stated that women who "reported being very self-confident in their ability to exercise were up to 5 times more likely to be active or to meet physical activity recommendations then women reporting low self-confidence" (p.99). The only community where this correlation was not seen was the Latina community where high self-efficacy for exercise correlated with a lower level of physical activity.

A meta-analysis conducted by Marshall and Biddle (2001) to explore applications of the transtheoretical model (TTM) examined the relationship between self-efficacy and Stage of Change. Stage of Change and TTM has been used to explore the process through which someone goes through a behavior change. TTM was first used in the field of addiction studies and has since been used to explore how individuals begin and maintain the habit of physical activity. There are 5 stages: 1) pre-contemplation (no intention of becoming physically active), 2) contemplation (thinking about starting to become physically active within the next 6 months), 3) preparation (making small changes yet still not meeting recommended levels of physical activity) 4) action (meeting recommended levels of physical activity but not yet for a continuous 6 months) 5) maintenance (meeting recommended levels of physical activity for at least 6 months) (Prochaska & DiClemente, 1983). This process has been seen as a linear process however

individuals are continually moving forward and backward through the process (Prochaska & DiClemente, 1983). Their meta-analysis examined 91 independent studies across the stages of change. Interestingly, they state that "in contrast to theoretical predictions, the pattern of increase (in self-efficacy) appears nonlinear" (Marshall & Biddle, 2001, p.239). "Effects (are) characterized as moderate (pre contemplation to contemplation), small to moderate (contemplation to preparation), moderate (preparation to action) and moderate to large (action to maintenance)"(Marshall & Biddle, 2001, p. 239). Our study is unique in that most studies examine adherence to an exercise program or exercise recommendations evaluate only individuals in the contemplation or preparation stage. There are few studies that examine individuals participating in an existing program. These findings indicate that someone in the first six months of a new physical activity or exercise program will have many small successes and a few setbacks. As they work through these setbacks and continue to experience success, they will continue to increase their level of self efficacy for exercise. This parallels findings by Bandura mentioned previously.

According to Bandura, in order for self-efficacy to be a useful predictor of behavior, it needs to be measured in relation to the specific task rather than one's general level of self-efficacy (Bandura, 1977). In the initial stages of "mastery," increases in self-efficacy only transfer to like tasks. Only after several successful "performances," will the self-efficacy increase begin to flow into other areas of life that also require a similar level of effort (Bandura, 1977).

A study conducted by Yeung and Hemsley (1997) set out to measure the relationship between self-efficacy for exercise in relation to exercise attendance in the context of a voluntary group exercise program. An adapted version of the Sallis Self Efficacy for Exercise Survey was utilized to measure the self-efficacy of 46 previously sedentary women. Self-efficacy was defined as how confident an individual is to exercise in twelve different situations. The women were given access to an instructor lead group exercise program 3 times a week for 8 weeks for a total of 23 workouts. No attempt was made to enforce attendance. The overall average attendance was 11.1 classes. Using stepwise multiple regression tools it was found that "only extraversion and exercise self-efficacy were significant predictors of overall exercise adherence" (Yeung & Hemsley, 1997, p.428). The authors plan to use this information to help create a profile of someone who is more likely to adhere to an exercise program (Yeung & Hemsley, 1997). This profile will be helpful but may be limited to those in the contemplation or preparation stages of the TTM. Further research must be done to create a profile of the physical activity participant who is in the action or maintenance stage of the TTM.

Williams and colleagues (2008) examined determinants of physical activity maintenance among individuals who have already adopted a consistent physical activity program. Specifically, this study examined what factors influence individuals who maintain physical activity over twelve months compared to those who never adopted and those who initially adopted exercise but did not maintain their exercise for 12 months. Psychosocial predictors of physical activity among 205 previously sedentary adults enrolled in home based physical activity trial were assessed. All questionnaires were

completed at baseline, six months and twelve months. Results indicate that "self efficacy was the strongest predictor, with 139% increase in odds of being physically active at 12 months with each one standard unit increase in self-efficacy" (Williams et al., 2008, p.191). This is bolstered by a study by Miller et al. in which 554 women with young children were given either; no intervention (surveys only), a print intervention or a print intervention along with semi-regular meetings to discuss strategies to overcome barriers to exercise. The study found that self efficacy mediated the effect of the intervention on physical activity (Miller et al., 2002). Several intervention studies based on SCT and the TTM have attempted to increased exercise by increasing self-efficacy and other factors related to the above theories. For example, Marcus and colleagues (1998) randomly assigned 150 sedentary or low active participants to either receive motivationally tailored print materials or standardized print materials developed by the American Heart Association. Participants in the intervention group were mailed motivationally tailored information at one week, one month, three months and six months. Those in the control group were mailed American Heart Association manuals at the same intervals. There were no significant differences in the number of participants who had reached the action stage at one month however there was a significant increase in the intervention group at months three and six relative to the control. The intervention helped move the volunteers from pre contemplation, contemplation or preparation to action but stopped there.

A follow-up study examined what factors predicted long-term maintenance of exercise. Bock and colleagues evaluated the physical activity levels of individuals receiving either motivationally tailored materials at months 1, 3 and 6 or standard

American Heart Association materials (Bock et al., 2001). Their activity levels along with several psychological surveys were assessed at each of those intervals and again at 12 months. At six months, both groups reported a significant increase in minutes of physical activity per week. Both groups also reported significant increases in self-efficacy and cognitive and behavioral processes (Bock et al., 2001). Results at month 12 indicate that those who were meeting or exceeding 150 minutes of physical activity per week, reported significantly higher self-efficacy (Bock et al., 2001). It was also found that those maintaining the recommended level of physical activity had significant increases in both cognitive and behavioral processes (Bock et al., 2001). The majority of those who maintained their level of physical activity from month 6 to month 12 were in the intervention group (Bock et al., 2001).

Lewis and colleagues (2006) conducted another follow-up study to examine which potential factors mediated the relationship between the intervention and physical activity. Results from this study indicated that an "increase in the use of behavioral processes and increases in self-efficacy …were significantly related to increases in minutes of physical activity behavior" (Lewis et al., 2006, p.200). Results indicate that both groups increased their level of physical activity with the intervention group increasing their minutes of physical activity per week significantly more than the control (151.4+- 148.6 vs 97.6+-98.3)(Lewis et al., 2006).

Another intervention study used both print and telephone contacts to increase physical activity among sedentary adults (Marcus et al., 2007a). Project STRIDE utilized motivationally tailored telephone and print based contact for 6 months and conducted a

follow-up at 12 months. Results from the study indicated that those in both the print and telephone group were significantly more active than those in the control at 6 months. However, only those in the print group were significantly more active at 12 months (Marcus et al., 2007b). Similar and positive changes in self-efficacy were seen from baseline to 6 months within each group. However, from 6 months to 12 months the print group continued to increase in their level of self-efficacy while the telephone group's self-efficacy began to decline back towards baseline (Marcus et al., 2007b).

Family and Friend Social Support for Exercise

Social support is another important predictor of physical activity among women (Huberty et al., 2008; Kaewthummanukul et al., 2006; Miller et al., 2002). For example, the Women and Physical Activity Survey found that having family and friends who exercise is significantly and positively related to one's own level of physical activity in Native Americans, Latinas and Rural African Americans (Eyler et al., 2003a). However, the correlation for urban Latinas was reversed. Additionally, individuals were more likely to exercise if they saw other people exercising in the neighborhood (Eyler et al., 2003a). As before, urban Latina women were the exception and had a negative correlation between seeing people exercise and their level of physical activity. This parallels the findings in the meta analysis by Trost et al. (2002) which found that social support was also an important correlate.

In a qualitative study conducted by Huberty et al. (2008), major themes for adherers to physical activity recommendations and non adherers were obtained. Women

were asked to complete the Modifiable Activity Questionnaire. For the purposes of this study, adherers were defined as those who had participated in at least 30 minutes of moderate physical activity most days of the week (150 minutes per week or more) for at least the past 6 months. Focus groups of adherers, non adherers and mixed were interviewed. A common theme among both the adherers and non adherers was a need for support. This included either being accompanied by family or friends or receiving verbal encouragement from them (Huberty et al., 2008). Women expanded on the theme of the instructor saying they wanted a supportive instructor providing continual and long-term support (Huberty et al., 2008). These results are echoed in a study that showed partner support to be a mediator of physical activity change among mothers with young children (Miller et al., 2002). However, long term follow-up results indicate improvements were not sustained leading the investigators to ask how the short term improvements can be translated into sustained change (Miller et al., 2002).Another study analyzed the exercise habits of 970 nurses in Thailand based on the SCT and Health Promotion model (Kaewthummanukul et al., 2006). Surveys were used to gather data. Results indicated that perceived barriers to exercise, perceived social support, and self-efficacy predicted exercise (Kaewthummanukul et al., 2006).

A meta-analysis by Carron et al. measured the effect of many different types of social influence on exercise behaviors, cognitions, and affect (Carron, Hausenblas, & Mack, 1996b). The inability to draw conclusions from the data was noted throughout the paper due to a lack of research or quantity of data. However, they were able to conclude that when individuals begin an exercise program due to the advice of a healthcare

provider support from the family is two times more important than when the individual begins an exercise program due to their own choices (Carron et al., 1996b). These findings and others like it, are important as we move forward with research in the field.

Group Cohesion

Group cohesion is the tendency of a group to stick together in the pursuit of a goal. Members also seek out and find satisfaction with the group and its ability to fill their needs socially (Carron, Brawley, & Widmeyer, 1998). Carron and his colleagues have taken this definition and framed it in the context of sport with the following conceptual model: a)group cohesion can be measured by assessing individual members of the group, b)members feel differently based on how the group fills their needs and objectives c)individuals look to the groups social atmosphere as well as its ability to accomplish tasks as a measure of satisfaction of personal goals and needs (Carron et al., 1998). This model was then used to generate the Group Environment Questionnaire (GEQ). It was suggested that the GEQ would work well for all different types of groups, not exclusively sports teams. A consistent finding in the literature is the positive relationship between exercise adherence and group cohesion (Burke, Carron, & Shapcott, 2008). Research by Estabrooks and Carron(2000), found that the GEQ was not appropriate for exercise groups (Estabrooks & Carron, 2000). These findings lead to adaptations to the GEQ leading to the creation of the Physical Activity Group Exercise Questionnaire (PAGEQ).

Both the PAGEQ and the original Group Exercise Questionnaire (GEQ) have been used extensively to measure levels of group cohesion in a variety of settings. A study conducted within a University setting examined 145 female aerobics class participants in 13 classes (average class size . Levels of lateness and absenteeism were evaluated. The classes were divided with half (6) of the instructors receiving specific information on team building and suggested tasks to complete with their classes. The remaining 7 classes were a non-treatment control group. The instructors in the control group were unaware of the focus of the study. Results indicated that those in the intervention group had much stronger feelings (mean score 30.5) on the individual attraction to the group-task (ATG-T) (Spink & Carron, 1993). The experimental group had a much lower level of dropout than the control, representing a meaningful effect of the intervention (Spink & Carron, 1993). There were also fewer late arrivals in the experimental group versus the control. Results were not statistically significant but represent a modest effect of the intervention (Spink & Carron, 1993).

Spink and Carron examined group cohesion and absenteeism and lateness of 171 women in 11 different non credit group fitness classes at a University. Questionnaires were administered during the last week of a 4 week period within which the women were recording their own attendance (x if they were on time, - if they were late) (Spink & Carron, 1992). Results indicated that group cohesion levels of ATG-T and ATG-S positively predicted greater attendance when compared with those with lower scores (Spink & Carron, 1992). Those with a low level of absenteeism had a mean ATG-T score

of 33.2 and a mean ATG-S score of 29.8. This compares to those with higher levels of absenteeism ATG-T scores of 29.6 and ATG-S scores of 26.2.

Shapcott and colleagues (2006) examined member diversity and its affect on cohesion. Results indicated that member diversity had an inverse effect on the level of the group task cohesion for a walking program in Kansas. The type of member diversity that had a negative impact on group cohesion was not ethnic or gender but rather the members diverse levels of physical activity prior to entering the program. The study also found that "the more diverse the group in terms of member physical activity level, the poorer they group performance with respect to the total distance walked (over the course of the program)" (Shapcott, Carron, Burke, Bradshaw, & Estabrooks, 2006, p.712).

Summary and Conclusions

Several studies have examined factors that influence physical activity adherence within randomized controlled research trials (e.g., Marcus et al., 20007, Trost et al., 2002, Williams et al., 2008). The major limitation of these studies is that they were conducted in highly controlled research settings, which are not easily generalizable to the real world (e.g., stringent exclusion criteria, highly trained research assistants, participants paid for participation). There is little research examining real-world fee-based physical activity programs. It is possible that variables examined in these highly controlled studies (e.g., self-efficacy, social support) are not relevant to individuals who seek out group-based exercise programs. The purpose of this study was to examine factors that may influence adherence to a fee-based exercise program administered in "the real world." The effect

of an email-based intervention to increase exercise adherence was also explored through the use of motivationally tailored emails.

Study 1

Overview of study The purpose of this study was to investigate factors that influence adherence to a group-based exercise program. The specific study group was chosen to encourage generalization to populations of women in their child rearing years. The population is unique due to the fact that participants have signed-up and paid to participate in an 18 week running program designed specifically for women, most with children. This research adds to the literature due to the novel nature of the group being studied. Most previous research has studied participants who volunteer to take part in a study about physical activity. This study is unique due to the fact that we did active versus passive recruitment. Specifically, we contacted all participants possible rather than having them respond to an advertisement. A correlational cross-sectional design was used to examine several psychosocial variables related to participation in an 18 week running program. Baseline and post-test self-report surveys were administered to examine perceived self efficacy for exercise and perceived family and social support for exercise at both baseline and post-test. The post-test also included a measure for group cohesion.

Hypotheses We hypothesized that high baseline levels of self-efficacy for exercise would related to high levels of attendance at the exercise program. We also predicted that high baseline levels of family and friend's social support would be related to high levels of attendance. Given the group participants would likely be supportive of one another, we

also hypothesized that participants would increase their level of friend support for exercise from baseline to the end of the program. We predicted a small to no increase in the level of family support for exercise due to the initial "buy in" by the family to allow the participant time to join the run club. We also examined how group cohesion for exercise relates to group size and attendance levels. These evaluations were considered exploratory.

Study 2

Overview of study A small pilot experimental intervention was also conducted to examine if motivationally tailored emails increased adherence to the running program. The messages in the emails were based on the Transtheoretical Model and were designed to increase the use of both behavioral and cognitive processes of change.

Due to previous research it was decided that the emails would target several of the ten processes of change: increasing knowledge, being aware of risks, caring about consequences to others, comprehending benefits, increasing health opportunities, substituting alternatives, enlisting social support, rewarding oneself, committing oneself and reminding oneself (Lewis, Marcus, Pate, & Dunn, 2002; Marcus & Forsyth, 2009). The emails were sent mid week, weeks: 3, 4, 5, 6, 8, 10, 12, 15, 18 for a total of 9 emails (Appendix H).

Hypothesis We hypothesized that those receiving the emails will have higher levels of attendance in the running program than those in the control group.

Methods

Participants

Participants were recruited from the Moms on the Run (MOTR) program. Moms on the Run was in its 4th year during the 2011 season (late April to late August). The program has continued to expand across the Minneapolis and St. Paul area and in 2011 was in 10 cities. All of the cities were suburban and no programs were run in the cities of Minneapolis or St. Paul. The diversity in size is dramatic across the 10 clubs. The size of the program in each city ranged from 12-70 during the 2011 season. This lends itself very well to the study of group size and cohesion levels. Overall the entire club had nearly 500 participants during the study year. Due to the survey nature of this study a large sample size is necessary to have adequate power for establishing significant findings.

Study 2 The email intervention was designed to assess the feasibility of an email intervention to enhance adherence. Given this is a feasibility study, we chose to pilot the intervention at one site which we estimated would result in approximately 50 participants.

Across all cities the running program and education are set by the programs CEO and all coaches are asked to run the program accordingly. All coaches are required to be certified as a Moms on the Run coach and are therefore trained in how to coach the runners and deliver other information related to the program. The coaches were introduced to both studies at this certification class and the steps necessary to administer the questionnaires. Coaches were asked to administer the questionnaires during the

second or third workout of the season (questionnaires were not allowed during the first class due to the extensive amount of administrative work the coaches needed to do).

Inclusion Criteria All women participating in the Moms on the Run Program for the 2011 season were asked to participate in the study. These women were living in the suburbs of Minneapolis and St. Paul, Minnesota. The age range was 24 to 57 years of age. The Moms on the Run program is marketed towards mothers but it is not necessary to be a mother to participate. All women were requested to be in generally good health to participate. Participants were required to fill out a waiver at the beginning of the season indicating they are healthy and cleared to participate in a planned exercise program.

Exclusion criteria All women who participate in Moms on the Run must be generally healthy so no exclusions were set for issues related to ill health. Women were pregnant and those who were under the age of 18 were excluded. Coaches of the run club were also excluded due to their knowledge of survey goals.

The Institutional Review Board at the University of Minnesota granted IRB approval for this study (IRB#1101P95111).

Moms on the Run Program The running program is an 18 week, 36 workout, interval training program designed to gradually move women who are new to running to the point where they are able to complete a 5K. Workouts are designed to take approximately 40 minutes and take place 2 times per week. This includes a 5 minute walking warm-up and a 5 minute walking cool-down. The workout itself alternates between walking and jogging segments. For example, during the first few weeks participants may walk for 3

minutes and jog for one minute. This pattern will be repeated 6 times throughout the workout. Later in the program participants may walk for 1 minute and jog for 10 minutes repeating 3 times. Gradual increases in the overall amount of running are added to the program each week therefore reducing the amount of walking participants are doing during the workout. Throughout the workout coaches are encouraged to move between the groups of runners answering any questions, encouraging their great effort and getting to know each participant on an individual level.

Measures

Initial Questionnaires

Voluntary and Informed Consent Printed questionnaire packets were handed out to participants during the second or third workout of the season. The first page was the informed and voluntary consent form (IRB#1101P5111). Participants were given an overview of the study, an explanation of the voluntary nature of the program and contact information for any questions they may have (see Appendix A).

Demographics Questionnaire Participants completed a demographics form (see Appendix B). Basic demographics information related to age, level of education and employment, marital status and number of children. In an effort to evaluate their level of physical activity prior to the beginning of the running program we also included the Godin Leisure Time Physical Activity Questionnaire (Godin & Shephard, 1985). We chose Godin because it was very brief. Specifically, “considering a 7 day period (a week), how many times on the average do you do the following kinds of exercise for

more than 15 minutes during your free time" (Godin & Shephard, 1985, p.146). Participants were then asked to indicate how often they participated in strenuous exercise, moderate exercise, and mild exercise (Godin & Shephard, 1985). Overall accuracy of weight classification based on results from the questionnaire are 66% (Godin & Shephard, 1985). Two week test-retest reliability coefficients are strenuous (.94), moderate (.46), and light (.48) for a total of .74 (Godin & Shephard, 1985).

The final section of the demographics forms asked for their name, e-mail address and Moms on the Run Location. We also asked if we may contact them via e-mail with any further questions we may have. It is from these responses that we were able to generate the e-mail list for the follow-up questionnaire. Those who said "no" and/or did not include an email address, were not contacted and therefore did not provide follow-up results.

Family and Social Support for Exercise Survey Participants completed a questionnaire to address family and social support for exercise (see Appendix C). The questionnaire is the abbreviated version of the Social Support and Exercise Survey created by Sallis et. al. (1996, see Appendix D). Questions are designed to evaluate how much support participants have felt from both their family and friends over the last month. Behaviors (thirteen in total) such as "did physical activity with me" and "complained about the time I spend doing physical activity" are listed and participants are asked to rank friends and family separately on a Likert scale of 0 to 4. Zero represents "none," two represents "a few times" and four represents "very often." Test-retest reliability for each factor has been measured at 0.55 to 0.86 (Sallis, Grossman, Pinski, Patterson, & Nader, 1987).

Internal consistency for each factor was measured using Cronbach's alpha with coefficients from 0.61 to 0.91(Sallis et al., 1987).

Sallis Self-Efficacy for Exercise Questionnaire Participants also completed an exercise confidence survey also created by Sallis et. al. (1996, see Appendix D). The questionnaire assesses how confident the individual is to exercise in 12 different situations including "get up early, even on the weekends, to exercise." Participants are asked to indicate how confident they are that they can exercise in the situation on a Likert scale of 1 through 5. One represents "I know I cannot," three represents "maybe I can" and five represents "I know I can." Test-retest reliability was .68 (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). Cronbach's alpha provided an alpha coefficient for internal consistency was .83 and .85 (Sallis et al., 1988).

Follow-up Questionnaire (on-line)

The follow-up questionnaire was conducted online via UMSurvey. Those participants who included their email address and indicated that we could contact them were sent the follow-up questionnaires. The first page of the survey was a very brief follow-up demographics questionnaire asking about any injuries they may have sustained during the season or other issues that may have made it difficult for them to participate fully in the running program (Appendix E). The participants also completed the same abbreviated version of the Social Support Confidence surveys.

Physical Activity Group Environment Questionnaire In addition to the previously described questionnaires, participants also completed the Physical Activity Group

Environment Questionnaire (PAGEQ) (see Appendix F). The Physical Activity Group Exercise Questionnaire (PAGEQ) is an adaptation of the Group Exercise Questionnaire (GEQ) which was originally designed for sports teams (Estabrooks & Carron, 2000). The directions specify that "this questionnaire is designed to assess your perceptions of your physical activity group." The first set of twelve questions relate to "your personal involvement" with statements such as "I like the amount of physical activity I get in this program" and "if this program were to end, I would miss my contact with the other participants." These statements are rated on a Likert scale of 1 thru 9, one representing "very strongly disagree," five representing "neither agree nor disagree" and nine representing "very strongly agree." The second set of questions relate to "your physical activity group as a whole" with statements such as "members of our physical activity group often socialize during exercise time" and "we encourage each other to get the most out of the program." Again the statements are rated on the same Likert scale of 1 thru 9.

Results from the questionnaire indicated scores for four different variables or constructs of group cohesion. Group integration "represents the individual's perceptions about closeness, similarity, and bonding with the group as a whole" (Burke et al., 2005, p. 271). This is then expressed both as a task orientation and as a social orientation giving us: group integration-task (GI-T) and group integration-social (GI-S). "Individual attractions to the group represents the individuals perceptions about personal motivations acting to retain him in the group" (Burke et al., 2005, p. 271). This is also broken into task and social groupings giving us: individual attractions to the group-task (ATG-T) and individual attractions to the group- social (ATG-S).

Study 2 The city chosen for the e-mail intervention was administered a slightly different consent form that included a basic description of the e-mail intervention (see Appendix F). The demographics form for this city was identical to that of the other cities with the addition of a description of the e-mail intervention and opportunity to opt in or out of the intervention (see Appendix G).

Confidentiality

Each initial questionnaire was labeled with a unique participant number. Once the initial questionnaire was completed all data was related to the participant number and no longer linked to their name. All surveys have been kept in a locked file cabinet in the locked offices of the researcher at the University of Minnesota. All data are stored on password-protected computer and access has only been given to researchers related to the study. The Institution Review Board of the University of Minnesota has determined that the use of UMSurvey is the most secure option for on-line surveys and is their preferred option. All reports related to this study will only reference participant numbers; names will never be used.

Procedures

Study 1

Initial Questionnaires Participants were asked to complete paper and pencil questionnaires on site and return them to their coaches immediately after completion. This method of administration resulted in lower numbers than anticipated, some women only run one day per week and people are not able to attend every scheduled workout due

to scheduling conflicts (vacation, children's sporting events, sick kids, lack of childcare). Coaches were allowed to administer the survey at either the beginning or the end of the workout, whichever was most convenient for them.

Follow-up Questionnaires On the demographics form (in the initial questionnaire) women were asked if they would be willing to share their email addresses for any further form of contact related to the study. Those that shared their email addresses and indicated that we could contact them via email were asked to complete the follow-up questionnaires the last week (week 18) of the running program. The follow-up questionnaire was administered through the University of Minnesota via UMSurvey. Due to the nature of the running program this was determined to be the most efficient way to reach the largest number of participants. This allowed us to contact those who dropped out of the program and those who are unable to attend every workout. The survey opened the Monday of the final week of the running program (week 18) and remained open for two weeks, closing the Sunday of week 19. An e-mail invitation, with a link to the on-line questionnaires, was sent on the day the survey opened. For those who did not complete the survey within the first week, a follow-up reminder e-mail was sent at the beginning of week 19.

Study 2

Initial Questionnaires The email intervention was imbedded within the Forest Lake program. This city was chosen due to the large estimated number of participants. It was estimated that the program in Forest Lake would have 70 participants during the 2011

year. Participants completed the same initial questionnaires as the rest of the participants in the study with the addition of one small segment at the end of their demographics form where they were asked to indicate whether they would be willing to participate in the email intervention (see Appendix G). During week two of the running program participants who were willing to participate in the intervention study, were randomly assigned using Microsoft Excel, to either the email or control (no email) group. Motivationally tailored emails were sent to participants in the intervention starting Wednesday of week three. Along with the email message they were asked to reply to the first email indicating that they received the email. The remaining emails were sent out on Wednesday and followed the schedule of week 4, 5, 6, 8, 10, 12, 15 and 18(see Appendix H).

Follow-up Questionnaires There was no difference between the two groups in the follow-up questionnaires (Appendix E) administered.

Data Analysis

Several different statistical analyses were utilized to analyze the data. A repeated measures ANOVA analysis was used to examine within subject changes from baseline to post-test on self-efficacy and social support for exercise. Correlations (Pearson r) between individual levels of self-efficacy at the beginning of the study and attendance levels at the completion of study was calculated. Correlational tests were also utilized to examine the relationship between scores on the PAGEQ and their attendance.

Correlational tests were utilized to examine the relationship between overall group size and the level of group cohesion for that "team." Lastly, paired t-tests were used to examine the effects of the intervention on adherence to the program relative to the control.

Results

Demographics Table 1 summarizes the demographic information for the participants. Since the marketing focus of the MOTR program is mothers, the average age of the participants was 39.7 years of age (24-57 years of age). Participants have some level of college experience with 70% having a 4 year or graduate degree. The majority of the women work outside the home. About half of the women work 31 or more hours per week. A large majority, 93%, of the women are married. Eighty five percent of the women have at least 1 child in the home. The question asked "How many children, under the age of 18, are living with you?" Several of the runners had children, at home or not, that were over the age of 18.

Table 1. Demographics

Demographics	Total sample n=121	Percentage
Age (mean)	39.7	
Highest Grade		
less than HS	0	0%
High school	4	3.30%
Some college	16	13.20%
2 year degree	15	12.40%
4 year degree	46	38.00%
post graduate work	39	32.20%
Outside Employment		
Yes	90	74.40%
No	31	25.60%
Job Description		
Professional	65	53.70%
Clerical	20	16.50%
Craft/Trade	3	2.50%
Other	10	8.30%
None	23	19%
Hours per Week		
none	23	19.00%
1-15	3	2.50%
16-30	16	13.20%
31-45	51	42.10%
61+	10	8.30%
Marital Status		
Single	2	1.70%
Married	113	93.40%
Divorced	5	4.10%
Widowed	1	0.80%
Number of Children		
none	16	13%
One	26	21.50%
Two	49	40.50%
three	23	19.00%
four +	5	4.10%
no response	2	1.70%

Participation The level of participation in the survey varied across all cities. Table 2 indicates the number of participants in each city as well as how many completed the initial questionnaire. We were able to capture 38% of the total sample population (N=316) with the initial questionnaire. Of those completing the initial questionnaire, 50% completed the follow-up. Therefore, 19% of the overall population completed both the initial and follow-up questionnaire.

Table 2. Attendance and Questionnaire Completion Data

City(total participants)	Initial Survey	Follow-up Survey	Overall Attendance of Study Participants
White Bear Lake(N=42)	10	5	85.80%
Apple Valley(N=48)	23	18	64.40%
Forest Lake(N=42)	28	16	65.60%
Eden Prairie(N=30)	10	3	no data
Shoreview(N=40)	13	4	44.40%
Blaine(N=68)	16	6	no data
Coon Rapids(N=46)	21	9	62.70%
	Average Total Attendance		64.58%

Family/Social Support and Self-Efficacy The repeated measures ANOVA indicated no significant increase from baseline to post-test on family support and self-efficacy (see Table 3). Scores at initial testing for family support range between 8 and 46. At post testing scores ranged from 7 to 46. However, friend social support did increase from baseline to post-test (21.9 to 24.19). Scores for social support ranged from 8 to 50 at initial testing and 8-46 at post testing.

Table 3. Pre and Post Table of Means

Variable	Pre (n=121) Mean*	Post (n=60) Mean*	P-value**
Family Support	26.0(8.8)	26.45(9)	0.501
Social Support	21.9(9.5)	24.19(8.7)	0.049
EC-stick to it	3.3 (0.9)	3.44(0.8)	0.15
EC-make time	3.4 (1.0)	3.43(0.8)	0.72

*Standard deviations are in parentheses
** P-values calculated with a repeated measures ANOVA

The examination of initial levels of exercise confidence and overall attendance levels indicate no significant correlation.

Group Cohesion The examination of the correlation between sub scores for Group Cohesion and individual attendance indicated a significant correlation between attendance and Individual Attraction to Group Social (IAGS) (see Table 4). These results indicate that greater attendance was seen in women who felt the group had accepted them and integrated them into the group. The relationship between Individual Attraction to Group Task (IAGT) and attendance approached significance (P-value .08). Individual Attraction to Group Task was significantly correlated with group size. Taken together, these findings indicate that the larger the group-size the more participants feel the group is helping to get them to their own individual goals. This in turn may help to increase attendance.

Table 4. Correlations

Variable	Individual Attendance		Class Size	
	r2	P-value	r2	P-value
IAGT	0.251	0.073	0.29	0.023
IAGS	0.419	0.002	0.008	0.95
GAT	0.03	0.836	0.067	0.609
GAS	0.092	0.516	-0.226	0.08

Study 2 The intervention arm of study attended an average of 65.8% of the sessions and the control arm attended an average of 65.3% of the sessions. There was no significant difference between the two groups in attendance rates.

Discussion

Our study of the Moms on the Run program was designed to evaluate women in an existing physical activity program. We chose this approach in order to find women who had sought out, signed-up for, and paid for a program. It was our goal to find a sample that was different from the traditional intervention style study that focuses on examining volunteers. We anticipated that our sample would be similar to some studies but also have some findings that were discrepant with previous studies.

Consistent with our hypothesis, there was no significant increase in the participants' level of family support for exercise from baseline to post-test. This does not mirror the findings of Miller (2002) which demonstrated that family support for exercise was a primary indicator of a woman's level of physical activity (Miller et al., 2002). Similar findings were found in the Kaewthummanukul, (2006 study), however the women in this study were mainly single female nurses, living and working in a city in

Northern Thailand. Given the nature of the program, we anticipated that the members of the run club would have needed to gather a high level of family support prior to joining. The program met for a total of 32 workouts over 18 weeks with workouts scheduled weeknights typically at 6:30 and weekend mornings or evenings, depending on the city. For example, one site met at 6:30 Wednesday evenings and again at 6:30 Sunday evenings. In order for women with children to be able to get this much "free time," she likely needed to have the support of her family in order to care for the children. In total, run club kept women away from the home for somewhere between 1.5 and 2 hours each session. Women were also encouraged to participate in races throughout season, which added to their time commitment. Consistent with our hypothesis, participants increased their friend social support for exercise from baseline to post-test. This parallels many studies previously mentioned (Eyler et al., 2003; Huberty et al., 2008; Kaewthummanukul et al., 2006). Perhaps the participants joined the Mom's on the Run program to keep them accountable for exercising. It is possible that knowing that their new friends were expecting them to show up, kept them coming on days they were lacking motivation.

The correlation between Individual Attraction to Group Social (IAGS) and individual attendance highlights the importance of the social aspect of the program and the friendships that are formed, similar to previous research. This parallels previous research (Spink and Carron,1992) indicating that IAGS is a significant indicator of heightened levels of attendance. Research indicates that the IAGT subscale is the strongest predictor of one's attendance to a group exercise program among the four

group cohesion subscales. In our study, IAGT, one's perception of their involvement with the group task, approached significance but was not significant. This is surprising given all participants train to complete the same 5k at the end of the season, implying that they are all working towards the same task.

There was a negative relationship between group size and GAS (group attraction social, closeness, likeness, and bonding as a whole). It may be possible that this is seen in some of the larger programs. As the program gets larger, it is possible that small groups form within the larger group, leaving participants to feel the group is disjointed. To date, we have seen little research on the importance of group size in relation to the level of cohesion felt by the individual participants.

Study 2 The email intervention indicated no results. It is possible that the addition of a feedback request from those receiving the emails or added telephone contacts would increase the impact of the emails therefore improving attendance scores for those in the intervention.

Limitations This study is an evaluation of an existing group exercise program designed specifically for women to train for and run either a 5k or 10k. The women in the program have paid between $175 and $350 to participate in the program. Every effort was made to make the program affordable to all and many partial and full scholarships were provided; however, in general most women paid the full amount. One limitation is that this decreases the generalizability of the findings beyond this type of program. Despite

this limitation, these findings may be helpful to corporations regarding designing better group exercise programs to enhance member experience and reduce dropout rates.

The response rate for this study was (39%). Given we used an "active" rather than "reactive" strategy, this level could be viewed as adequate. In other words, we asked every person participating on the Moms on the Run program to participate (active) rather than placing an advertisement and waiting for participants to respond to the advertisement (reactive). In traditional randomized trials, it is often not possible to determine the exact response rate given the rate of reading an advertisement cannot be assessed.

We had anticipated a much larger response rate but unfortunately the recruitment strategy recruitment strategy was not very controlled. Specifically, it was left to the coaches to advocate for the study and most did not have much connection to the study nor was there incentive for them to encourage their members to participate. In one city, we were told that one member decided there was "no way" she was going to participate in a study. She had a strong enough voice to deter many of the other members from participating as well. Additionally, many of the coaches for the individual run clubs did not have the time or desire to give further information about the study. We did not obtain surveys from 2 cities due to their noncompliance with the protocol. Specifically, one coach allowed her participants to take the surveys home. In the other city, the participants had not completed their surveys by week 3 and were therefore, told not to complete them. Given these issues, we feel the 39% response rate was adequate.

The CEO of Moms on the Run tries to hire coaches and assistant coaches who are upbeat, encouraging, and willing to comply with all of the expectations laid out in their contract. However, each coach is unique and brings her own level of expertise and energy to the program. The particular coach may have more of an influence on the energy and cohesion of the group than any other factor. Unfortunately, influence of the coach on each individual run club was not evaluated in this current study. A coach in one city was asked to step down after multiple complaints from the women in her program. She complied with the request and a new coach was brought in for the last month of the program. This was the only major issue related to individual coaches that the researchers are aware of.

Another limitation of the study was the accuracy of the attendance records. Researchers were unable to control the accuracy of the attendance records and the individual coaches were instructed to keep attendance records. It is those attendance records that we used to evaluate the attendance level of each individual runner in the program. The importance of the accuracy of the attendance records was reinforced when coaches were introduced to the study. However, we were not able to ensure that they kept accurate records. As a result, we were unable to obtain attendance records from two cities. In one city, the coach did not complete the season (she was asked to step down) and therefore we received no data. In the other city, which was the largest city, the coaches asked the participants to sign-in upon arrival but stopped having them sign in two weeks before the end of the season. When we calculated all of the signatures, we felt that the data were inaccurate and therefore, this city was left out of the calculations.

Another limitation was our use of the Godin Leisure Time Physical Activity Questionnaire to assess physical activity. The goal of the survey was to assess the women's level of physical activity prior to the beginning of the season. As stated earlier, time constraints made it impossible for us to administer the questionnaires during the first week of the program. Therefore, we had women document the exercise they did in the week prior to the administration of the survey, which included exercise related to the running program. This unfortunately was not indicative of their activity level prior to the start of the program. The questionnaire states "consider a week," and does not indicate an average week or the week prior so it is left up to the participant to interpret. The problem with the questionnaire was that most women either did not understand the question or chose not to answer it altogether. It appears that this questionnaire works best when there is a researcher present to administer it. As a result, data from the Godin Leisure Time Physical Activity Questionnaire were not used in our final evaluation.

The email intervention also had limitations. First, the researchers were unable to determine if those receiving the email intervention actually opened and read the material. We did ask those receiving the emails to reply to the first one, indicating that they had received the e-mail. If no reply was received, we verified the e-mail address and resent the original e-mail. One participant did not respond to the e-mails. Throughout the study, we were able to determine if the email made it to their email account but we were unable to determine if they read them. The number of participants in the intervention study was far less than originally predicted. We chose the particular city due to the anticipated size (70 plus participants); however, the program did not draw as many participants as

expected. This and the low response rate to the initial survey resulted in a small intervention study.

Conclusion We evaluated the Moms on the Run program to examine changes in self-efficacy for exercise, family and friends social support for exercise, and levels of group cohesion. Friend social support increased significantly over the course of the program. This may be valuable information for Moms on the Run and other group-based fitness programs in that friend support may be helpful for physical activity adherence. Additionally, the relationship between high levels of individual attraction to the group socially (IAGS) and greater attendance is indicative of the level of importance women place on their personal connection to those in their group. Our results also indicate that group cohesion may be positively and negatively influenced by group size. This should be considered when developing exercise programs in real world settings. Coaches also need to focus on team building and encouraging individual contribution to the group as a whole. Further research is needed to further explore both the optimal group size of programs and the importance of friend support for exercise adherence.

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APPENDIX A

CONSENT FORM

Factors Affecting Adherence During an 18 Week Running Program for Moms.

You are invited to be in a research study of the factors that affect adherence to group exercise training programs. You were selected as a possible participant because you have signed up to participate in the Moms on the Run training program. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Laura Polikowsky, a master's degree student in the School of Kinesiology at the University of Minnesota.

Background Information

The purpose of this study is: to examine the effects of multiple factors on women's adherence to group exercise programs.

Procedures:

If you agree to be in this study, we would ask you to do the following things:

We will ask you to complete a series of questionnaires at the beginning of the Moms on the Run season. These questionnaires will ask about your current level of physical activity as well as social support towards exercise and your level of confidence as it relates to exercise. These questionnaires will again be completed at the conclusion of the program. There will also be an additional questionnaire assessing the cohesion of the group. The questionnaires should take no more than 10 minutes to complete.

Risks and Benefits of being in the Study

There are no risks associated with this study. There are however, risks associated with participation in the Moms on the Run program. These are risks associated with exercise including orthopedic injuries or exacerbation of a pre-existing medical condition. If you are injured during the season and are unable to complete the program we still ask that you complete the questionnaires.

There are no direct benefits to participation in this study.

Compensation:

A random drawing will be conducted at the conclusion of the study for those who have completed both pre and post questionnaires. Five winners will be chosen at random with each winner receiving a Moms on the Run gym bag.

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or Moms on the Run and any affiliated businesses. If you decide to participate, you are free to not answer any question or withdraw at any time with out affecting those relationships.

Contacts and Questions:

The researcher conducting this study is: Laura Polikowsky. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at polik004@umn.edu. You may also want to contact her advisor, Dr. Beth Lewis, at 612-625-0756 or contact her via e-mail at blewis@umn.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature:_____Date: _____

Signature of parent or guardian:_____ ____Date: _____

(If minors are involved)

Signature of Investigator:_____Date: _____

Appendix B

ID ____ Demographics questionnaire Date_____

Please circle your answers to the following questions.

What is your date of birth _____(MM/DD/YY)

What is the highest grade you have completed in school?

(1) Less than high school graduate (write in year 7-12) ___
(2) High school graduate
(3) Some college
(4) College graduate
(5) Post-graduate work

Are you employed?

Yes

No

Which of the following best describes your job?

1) Professional, administrator or executive(i.e., Government official, manager, purchasing agent, marketing rep., doctor, nurse, lawyer, teacher)
2) Clerical work, administrative support, sales, or technician(i.e. office worker, data processing occupation, sales clerk or supervisor, lab tech, LPN, legal assistant)
3) Crafts, trade, factory work, service, or labor(i.e. carpenter, electrician, machine operator, machinist, foreman, police officer, restaurant worker, barber)
4) Other(Please describe): _____

How many hours per week (on average) do you spend at your job?

(1)1-15 hours (2) 16-30 hours (3) 31-45 hours (4) 46-60 hours (5) 61 or more hours

What is your current marital status?

1) Single (never married)
2) Married
3) Divorced
4) Widowed
5) Separated
6) Don't know

How many children under the age of 18 are currently living with you?

1) None
2) One
3) Two
4) Three
5) Four or more

Current activity level:
Considering a 7 day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write next to each category the appropriate number).

1) strenuous exercise (heart beats rapidly) _____
   running, jogging, vigorous swimming or cycling, football, hockey
2) moderate exercise (not exhausting) _____
   fast walking, baseball, tennis, easy cycling or swimming, popular and folk dancing
3) mild exercise (minimal effort) ____
   yoga, bowling, golf, easy walking

Do you plan to use the IPhone application or online tracking options offered by Moms on the Run to track your exercise activity throughout the season? Yes/ No

Name:_____

E-Mail:_____

Moms on the Run Location:_____

May we contact you via e-mail with any further questions we may have? Yes/ No

Appendix C: Social Support for Exercise (Sallis, 1987)
The following questions refer to social support for your physical activity.

Below is a list of things people might do or say to someone who is trying to do physical activity regularly. Please read and answer every question. If you are not physically active, then some of the questions may not apply to you.

Please rate each question. Please rate how often any family member or friend has said or do what is described during the last month.

During the last month, my family(or members of my household) or friends	**None**	**Rarely**	**A few times**	**Often**	**Very often**
1. did physical activity with me					
Family	0	1	2	3	4
Friends	0	1	2	3	4
2. offered to do physical activity with me					
Family	0	1	2	3	4
Friends	0	1	2	3	4
3. Gave me helpful reminders to be pysically active(i.e."Are you going to do your activity tonight")					
Family	0	1	2	3	4
Friends	0	1	2	3	4
4. Gave me encouragement to stick with my activity program.					
Family	0	1	2	3	4
Friends	0	1	2	3	4
5. Changed their schedule so we could do physical activity together					
Friends	0	1	2	3	4
Family	0	1	2	3	4
6. Discussed physical activity with me					
Family	0	1	2	3	4
Friends	0	1	2	3	4
7. Complained about the time I spend doing physical activity					
Family	0	1	2	3	4
Friends	0	1	2	3	4
8. Criticized me or made fun of me for doing physical activities					
Family	0	1	2	3	4
Friends	0	1	2	3	4

	None	Rarely	A few times	Often	Very often
9. Gave me rewards for being physical active such as bought or gave me something I like					
Family	0	1	2	3	4
Friends	0	1	2	3	4
10. Planned for physical activities on recreational outings					
Family	0	1	2	3	4
Friends	0	1	2	3	4
11. Helped plan events around my physical activity					
Family	0	1	2	3	4
Friends	0	1	2	3	4
12. Asked me for ideas on how then can be more physically active					
Family	0	1	2	3	4
Friends	0	1	2	3	4
13. Talked about how much they like to do physical activity					
Family	0	1	2	3	4
Friends	0	1	2	3	4

Sallis, J. F., Grossman, R., Pinski, R., Patterson, T., & Nader, P. (1987). The development of scales to measure social support for diet and exercise behaviors. *Prevention Medicine, 16*, 825–836.

Appendix D: Self-Efficacy for Exercise (Sallis, 1987)

Below is a list of things people might do while trying to increase or continue regular exercise. We are interested in exercise like running, swimming, brisk walking, bicycle riding or aerobics classes.

Whether you exercise or not, please rate how confident you are that you could really motivate yourself to do things like these consistently, *for at least six months.*

Please circle one number for each question. How sure are you that you can do these things?	I know I cannot		Maybe I can		I know I can	Does not apply
1. Get up early, even on weekends, to exercise.	1	2	3	4	5	8
2. Stick to your exercise program after a long, tiring day at work.	1	2	3	4	5	8
3. Exercise even though you are feeling depressed.	1	2	3	4	5	8
4. Set aside time for a physical activity program; that is, walking, jogging, swimming, biking or other continuous activities for at least 30 minutes, 3 times per week.	1	2	3	4	5	8
5. Continue to exercise with others even though they seem to fast or too slow for me.	1	2	3	4	5	8
6. Stick to your exercise program when undergoing a stressful life change(e.g., divorce, death in the family, moving).	1	2	3	4	5	8
7. Attend a party only after exercising.	1	2	3	4	5	8
8. Stick to your exercise program when your family is demanding more time from you.	1	2	3	4	5	8
9. Stick to your exercise program when you have household chores to attend to.	1	2	3	4	5	8
10. Stick to your exercise program even when you have excessive demands at work.	1	2	3	4	5	8
11. Stick to your exercise program when social obligations are very time consuming.	1	2	3	4	5	8
12. Read or study less in order to exercise more.	1	2	3	4	5	8

Sallis, J. F., Grossman, R., Pinski, R., Patterson, T., & Nader, P. (1987). The development of scales to measure social support for diet and exercise behaviors. *Prevention Medicine, 16*, 825–836.

Appendix E

ID_____ End of Season Questionnaire
Date_____

Current activity level:
Considering a 7 day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write next to each category the appropriate number).

1) strenuous exercise (heart beats rapidly) _____
   running, jogging, vigorous swimming or cycling, football, hockey
2) moderate exercise (not exhausting) _____
   fast walking, baseball, tennis, easy cycling or swimming, popular and folk dancing
3) mild exercise (minimal effort) ____
   yoga, bowling, golf, easy walking

Did you begin the season by using one of the workout tracking devices? Yes/ No

Which one? IPhone Application/ On-line

Did you continue to use it throughout the season? Yes/No

If no, for how many weeks did you track your workouts? _____

Did you suffer an injury during the season that made it difficult for you to fully participate in a majority of the group runs? Yes/No

Were there any other issues that made it difficult for you to participate in a majority of the group runs?

_____

Appendix F: Physical Activity Group Environment Questionnaire (Estabrooks, 2000)
Part A.

- **The following questions are designed to assess your feelings about YOUR PERSONAL INVOLVEMENT with your physical activity group.**
- **Using the following scale, please write down a number from 1to 9 to indicate your level of agreement with each of the statements.**
- **If you neither agree nor disagree respond by using the number "5".**

1	2	3	4	5	6	7	8	10
Very Strongly Disagree	**Strongly Disagree**	**Strongly Disagree**		**Neither Agree Nor Disagree**		**Agree**	**Strong Agree**	**Very Strongly Agree**

#	Item	Answer
1	I like the amount of physical activity I get in this program.	
2	This physical activity group is an important social unit for me.	
3	I enjoy my social interactions within this physical activity group.	
4	The physical activity group provides me with a good opportunity to improve in areas of fitness I consider important.	
5	I like meeting the people who come to this physical activity group.	
6	I am happy with the intensity of the physical activity in this program.	
7	I like the program of physical activities done in this group.	
8	If this program were to end, I would miss my contact with the other participants	
9	I enjoy new exercise done in this physical activity group.	
10	In terms of the social experiences in my life, this physical activity group is very important.	
11	This physical activity group provides me with good opportunities to improve my personal fitness.	
12	The social interactions I have in this physical activity group are important to me	

Date: 4/11/2011

Part B.

- **The following questions are designed to assess your feelings about YOUR PHYSICAL ACTIVITY GROUP AS A SWHOLE**
- **Using the following scale, indicate your level of agreement with each of the statements.**
- **If you neither agree nor disagree respond by using the number "5".**

1	2	3	4	5	6	7	8	10
Very Strongly Disagree	**Strongly Disagree**	**Strongly Disagree**		**Neither Agree Nor Disagree**		**Agree**	**Strong Agree**	**Very Strongly Agree**

#	Item	Answer
1	Members of our physical activity group often socialize during exercise time.	_____
2	Our group is united in its beliefs about the benefits of the physical activities offered in this program.	_____
3	Members of our physical activity group would likely spend time together if the program was to end.	_____
4	Our group is in agreement about the program of physical activities that should be offered.	_____
5	Members of our group are satisfied with the intensity of physical activity in this program.	_____
6	Members of our group sometimes socialize together outside of activity time.	_____
7	We spend time socializing with each other before or after our activity sessions.	_____
8	Members of our group enjoy helping of work needs to be done to prepare for activity sessions.	_____
9	We encourage each other in order to get the most out of the program.	_____

Estabrooks, P. A., & Carron, A. V. (2000). The Physical Activity Group Environment Questionnaire: An instrument for the assessment of cohesion in exercise classes. *Group Dynamics: Theory, Research, and Practice, 4*, 230–243. doi:10.1037/1089-2699.4.3.230

IRB#1101P95111
Date: 4/11/2011

APPENDIX G

CONSENT FORM

Factors Affecting Adherence During an 18 Week Running Program for Moms.

You are invited to be in a research study of the factors that affect adherence to group exercise training programs. You were selected as a possible participant because you have signed up to participate in the Moms on the Run training program. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Laura Polikowsky, a master's degree student in the School of Kinesiology at the University of Minnesota.

Background Information

The purpose of this study is: to examine the effects of multiple factors on women's adherence to group exercise programs.

Procedures:

If you agree to be in this study, we would ask you to do the following things:

We will ask you to complete a series of questionnaires at the beginning of the Moms on the Run season. These questionnaires will ask about your current level of physical activity as well as social support towards exercise and your level of confidence as it relates to exercise. These questionnaires will again be completed at the conclusion of the program. There will also be an additional questionnaire assessing the cohesion of the group. The questionnaires should take no more than 10 minutes to complete.

Once we have received your initial questionnaires you will randomly be assigned to either the e-mail group or the non e-mail group. The assignment to each group is completely random. Participants in the e-mail group will receive a series of 10 e-mails over the course of the season. These e-mails will offer additional health and wellness information related to topics discussed throughout the Moms on the Run Program. Those in the non e-mail group will have the opportunity to receive the e-mails at the conclusion of the study.

Risks and Benefits of being in the Study

There are no risks associated with this study. There are however, risks associated with participation in the Moms on the Run program. These are risks associated with exercise including orthopedic injuries or exacerbation of a pre-existing medical condition. If you are injured during the season and are unable to complete the program we still ask that you complete the questionnaires.

There are no direct benefits to participation in this study.

Compensation:

A random drawing will be conducted at the conclusion of the study for those who have completed both pre and post questionnaires. Five winners will be chosen at random with each winner receiving a Moms on the Run gym bag.

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or Moms on the Run and any affiliated businesses. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is: Laura Polikowsky. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at polik004@umn.edu. You may also want to contact her advisor, Dr. Beth Lewis, at 612-625-0756 or contact her via e-mail at blewis@umn.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature:_____ Date:_____

Signature of parent or guardian:_____ Date: _____

(If minors are involved)

Signature of Investigator:_____ Date:_____

Appendix H

ID ____ Demographics questionnaire- Forest Lake
Date_____

Please circle your answers to the following questions.

What is your date of birth _____(MM/DD/YY)

What is the highest grade you have completed in school?

(6) Less than high school graduate (write in year 7-12) ___
(7) High school graduate
(8) Some college
(9) College graduate
(10) Post-graduate work

Are you employed?

Yes

No

Which of the following best describes your job?

5) Professional, administrator or executive(i.e., Government official, manager, purchasing agent, marketing rep., doctor, nurse, lawyer, teacher)
6) Clerical work, administrative support, sales, or technician(i.e. office worker, data processing occupation, sales clerk or supervisor, lab tech, LPN, legal assistant)
7) Crafts, trade, factory work, service, or labor(i.e. carpenter, electrician, machine operator, machinist, foreman, police officer, restaurant worker, barber)
8) Other(Please describe): _____

How many hours per week (on average) do you spend at your job?

(1)1-15 hours (2) 16-30 hours (3) 31-45 hours (4) 46-60 hours (5) 61 or more hours

What is your current marital status?

7) Single (never married)
8) Married
9) Divorced
10) Widowed
11) Separated
12) Don't know

How many children under the age of 18 are currently living with you?

6) None
7) One
8) Two
9) Three
10) Four or more

Current activity level:
Considering a 7 day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write next to each category the appropriate number).

4) strenuous exercise (heart beats rapidly) _____
   running, jogging, vigorous swimming or cycling, football, hockey
5) moderate exercise (not exhausting) _____
   fast walking, baseball, tennis, easy cycling or swimming, popular and folk dancing
6) mild exercise (minimal effort) ____
   yoga, bowling, golf, easy walking

Do you plan to use the IPhone application or online tracking options offered by Moms on the Run to track your exercise activity throughout the season? Yes/ No

Participants in Forest Lake will be part of a small sample testing the effectiveness of bi-weekly e-mails designed to encourage adherence to the Moms on the Run training program as well as the use of the on-line tracking options(IPhone or web-based). Assignment to either the e-mail or no e-mail group will be completely random. Participants who do not receive the e-mails during the program will be given the option of receiving them once the study has been completed.

Are you willing to participate in the e-mail based study? Yes/No

Name:_____

E-Mail:_____

Moms on the Run Location:_____

May we contact you via e-mail with any further questions we may have? Yes/ No

Appendix I

Week 3- Email 1 Benefits of Exercise

Congratulations on making the decision to join Moms on the Run. You have taken a huge step towards making running an important part of your life.

As we begin our third week of training it is important to start thinking about the reasons you have chosen to join Moms on the Run. When the workouts get more and more difficult it will be helpful to look back on these reasons to help keep yourself motivated.

Everyone has their own reasons for setting fitness goals, what are yours???

-more energy to keep up with the kids

-lower blood pressure and cholesterol

-accomplish a goal

-lose weight

-take on a big challenge

Week 4- email 2 Short term goals

Congratulations on making it through another week of training. Hopefully you have completed six or more workouts by now.

One really helpful way to keep yourself on track is to set a few short term goals. The goal of running a 5K or 10K may still seem like a far off dream so try to break it down into several small goals that will help get you to your ultimate goal. This also helps to build your confidence. Each small success helps to build upon the strength and stamina of your mental muscles along with improving your fitness level. Here are a few examples:

-do one cross training workout per week

-stretch 4 days per week

-one additional day of core work

-drink an extra glass of water

Week 5- email 3 Successful changes in the past

Congratulations on another week of Moms on the Run. If you were successful at reaching your workout goals for the week, way to go! If you are finding it difficult to get in all of the workouts you were hoping and are finding motivation to be one of your biggest issues, it may help to look back on a successful life change you have made before. This successful change could have happened because you either added a healthy habit to your life or successfully quit a bad habit. What steps did you take to ensure success at that time in your life? Can you apply those same steps to this new habit you are trying to integrate into your life?

Week 6-email 4 Support

Welcome to week six of Moms on the Run. As always, congratulations on making it here! If you have made the weekly goals you set for yourself give yourself a big pat on the back! If you did not make your weekly goals remember to focus on the benefits you are hoping to see from making your short term goals and how those goals are designed to bring you to your ultimate long term goal.

I am sure that one of the many reasons you chose to join Moms on the Run was due to the great amount of support you knew you would be getting from all of the other moms in the program as well as your coaches. Hopefully that support has helped to keep you running when you felt like you wanted to give up. As the workouts get harder and harder you will be relying on the energy and enthusiasm of other moms and they will be looking to you for the same kind of energy.

It may be a great time to step back to thank those at home who have helped to make this possible. Do you have a spouse or family member watching your kids while you get your running in? Do your kids get excited for you as you are getting ready to leave for another workout? All of this support makes it possible for you to enjoy your workouts and ensure that you are able to give some much needed attention to yourself.

Week 8- email 5 Cross training and injury prevention

Welcome to week eight of Moms on the Run! Hopefully your body is responding really well to the increase in the amount of time you spend running during each workout. If you have begun to experience any of the common physical issues associated with running like shin splints, sore ankles or low back, be sure to talk to your coach about it. She will be able to give you good suggestions on how to work through these issues so you can continue to run. One really easy and important solution is to begin cross training. Choosing the bike, elliptical, swimming, hiking or number of other cardio options will allow your legs some time to recover from the running while still helping to improve the strength of your cardiovascular system. This cross training may also

be a great way for you to continue to exercise if you find that you do not like running outside during the winter.

Week 10- email 6 trouble shooting before lapse/relapse

Welcome to week 10 of Moms on the Run. Congratulations on making it past the halfway point. How are you coming along in those short term goals you set for yourself?

One issue you may be confronted with this summer is the need to recover from a short lapse in your workout schedule. When things in life make it very difficult for us to stick with our normal workout schedule like a sick kid, travel for work, a week at the cabin or being sick ourselves we may find it difficult to pick up where we left off in our workout schedules. When life gets in the way try to find just a little time in your day to get in some physical activity. A quick workout of 10 minutes a couple of times a day is enough to keep your body in the groove.

In order to avoid the possible relapse into old habits it is important to be prepared for a lapse and know how to recover from it. First off remember that a lapse is not detrimental to your long term goals. You may find that your first workout after a little time off is more difficult than you had remembered but you will quickly be back to your old speeds again. You have worked hard to get to where you are and a few missed workouts is not enough for you to forget all of the time and energy you have put in to get here.

Week 12- E-mail 7 Rewards

Congratulations on making it to week twelve of Moms on the Run! Are you calling yourself a runner yet?

Today I want to talk about rewards. First off, are you experiencing any of the benefits from exercise you had come up with in our first e-mail? Do you have more energy, have you made a few new friends, have you lost a few pounds, are you confident in your ability to finish either the 5k or 10k race?? These benefits could be reward enough but you may also find it helpful to set-up a more formal reward system. Think back to some of the short-term goals you set for yourself. If you had the opportunity to get a pedicure if you accomplished one or two of them would you be more likely to follow through with them. What rewards would help to keep you motivated and on track? How can you incorporate those into your running program?

Week 15- email 8 long-term activity goals

Welcome to week 15 of Moms on the Run. The big race is only 3 weeks away. Hopefully you are feeling ready to take on the big day. As this season of Moms on the Run begins to wind down it is important to look into the future and your long term fitness goals. Do you plan to continue running through the winter months or will the cold and snow send you inside? Did you find an

activity that you love when you found your cross training options? Is there a gym in town that offers group fitness classes you want to take? The important thing to remember is that you have worked really hard to create this new habit and have made it possible for yourself to have enough time in your week to have a regular workout program. You want to hold onto that as you move into fall and winter.

Week 18- email 9 Congrats

The final week is here. Congratulations on making it through 17 weeks of Moms on the Run. This weekend is the culmination of 18 weeks of hard work and dedication on your part. There are just a few tips I want to leave you with. First, have fun during your race. Know that you have done everything you could to prepare yourself for the race this weekend. The rest is pure guts. Secondly, I would like you to remember how great you feel both during the race and after. The joy, energy and power you feel during the race can help carry you through the winter and right into the next season of Moms on the Run.

Have fun, you have earned it!!