University of North Carolina at Asheville
Journal of Undergraduate Research
Asheville, North Carolina
December 2013

The Effect of Exercise on the Work-Family Interface: A Follow-Up Survey

Laura Gardner
Health and Wellness Promotion
The University of North Carolina at Asheville
One University Heights
Asheville, North Carolina 28804 USA

Faculty Advisor: Ellen Garrison

Abstract

In the original study, "The Effect of Exercise on the Work-Family Interface: A Field Experiment Using Group Exercise Classes", a significant decrease in both WIF (work interference with family) and FIW (family interference with work) was seen in a long-term exercise group. This follow-up survey was done to ascertain whether study participants are still exercising after 11 months and if both WIF and FIW have remained low. Intensity of exercise, frequency of exercise, type of exercise, and potential barriers and motivators to exercising were all evaluated, along with corresponding work-family conflict and stress levels. Likert scales, multiple choice, and open-ended response were all used as measurement. Results were gathered and assessed in SurveyMonkey and were analyzed through student's 2-sample t-test, cross-tabulation and Chi Squares in MiniTab. Information on barriers and motivators for exercising and the WIF/FIW and stress levels associated with them was captured in the participant's responses. It is hypothesized that those who were in the treatment group will have continued to exercise more often than not. This hypothesis was not upheld. It is also hypothesized that those who have continued to exercise will exhibit lower WIF/FIW and lower stress levels than those who have not. While this hypothesis was not proven to be statistically significant, there was a correlation between those who were exercising and lower WIF/FIW and stress levels. Further research with larger sample sizes should be conducted on this topic in the future.

1. Introduction

Work-family conflict is defined as "a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" and is a faction of the work-family interface[1]. A number of studies have been done on the effects of the work-family interface on lifestyle behaviors. Through these studies, it has become readily apparent that those who have high levels of work-family conflict related stress eat greater amounts of fattier foods and exercise less often[2]. In the United States alone, more than one third of all adults do not meet the daily physical activity recommendations, and 24% of all adults do not consume five or more servings of fruits and vegetables daily[3]. These unhealthy habits are contributing to a national epidemic of skyrocketing obesity rates and chronic lifestyle related diseases, such as heart disease, stroke, and diabetes[3]. Not surprisingly, the stressors that lead to these unhealthy habits have become increasingly important to researchers in the field.

In addition to the skyrocketing levels of lifestyle related diseases, chronic stress levels play a crucial and debilitating role in exacerbating the effects of stress[4]. In a study investigating the link between chronic stress at work and the metabolic syndrome by Chandola et al (2006), over 10,000 middle aged men and women were observed over the course of 14 years[4]. The metabolic syndrome is a known collection of risk factors that increase the risk of chronic lifestyle related diseases such as type 2 diabetes mellitus and heart disease[4]. It was found that stress at work was a significant risk factor for the metabolic syndrome[4]. Thus, deciphering what can help alleviate these stressors that lead to the unhealthy lifestyle choices is one of the next steps in solving the injurious national epidemic.

Exercise is a known positive influence on stress and anxiety. In a meta-analysis done in 1995 by Long & Stavel, the effects of exercise training on anxiety were studied[5]. It was found that exercise significantly improved anxiety levels in exercise training treatment groups[5]. Results also revealed that those subjects who were more prone to living a more stressful lifestyle experienced greater improvements in stress levels than subjects who were not prone to stressful lifestyles[5]. These findings support the ideology behind exercise being beneficial to those leading anxiety-ridden, stressful lives.

It is known that beta-blockers have an adverse effect on mood and on anxiety levels[6]. In the study by Head et al (1996) researchers investigated the effects of aerobic exercise on the beta-blockade through the use of beta-blocking drugs and measurements of mood before and after 1 hour of treadmill use[6]. Their results supported that the beta-blocking drugs did in fact adversely affect mood and that the one hour of aerobic exercise after the induction of these drugs significantly improved the participants' levels of tension and depression[6].

Fortuitously, experiments measuring the effect that exercise has on mitigating psychological stress have shown positive results[7]. In a meta-analysis of cardiovascular reactivity done by Forcier et al in 2006, results showed significantly better heart rate recovery times in fit individuals in comparison to unfit individuals[7]. Faster heart rate recovery time allows for individuals to better deal with stress and anxiety, especially those experiencing high levels of work-related stress[7]. While Forcier et al focus predominantly on the physical benefits of exercise, there are also proven psychological benefits[8]. In one study by Ensel and Lin (2004), the researchers were able to find both physical and psychological benefits of exercise[8]. Through a representative sample of the community, they found that physical fitness and exercise were useful in the moderation of distress from everyday stressors[8].

In a study conducted by Salmon (2001), the effects that exercise has on psychological well-being were proven valuable in a clinical setting[9]. Not only was exercise's usefulness as a dissipater of distress and anxiety upheld, but the scope was also extended to include long-term resilience to stress and anxiety[9]. Thus, it can be said that exercise will not only alleviate immediate stress, but will also support the suppression of stress in the long run.

The positive effects that long term exercise has on the mitigation of WIF/FIW stress levels are also upheld in the experiment conducted by authors Clayton et al (2013) on which the follow-up survey discussed in this paper was based upon[10]. In the experiment Clayton et al conducted, more commonly referred to in this paper as the Zumba® study, the effect of exercise specific to the work-family interface was observed through the use of group exercise classes[10]. Specifically, the temporal effects that exercise may have on work-family conflict in working middle-age women were observed[10]. The group exercise class that was selected was a Zumba® class, which participants in the treatment group attended for four weeks[10]. Results for this experiment yielded significant decreases in WIF ($p= 0.001$) and FIW ($p= 0.10$) for those who participated in the long term exercise classes[10]. These results clearly show that participants who continue to exercise will exhibit lower WIF/FIW levels than inactive participants[10].

2. Methods

In October 2013, eleven months after the completion of the original study, a survey was distributed via email to all 46 study participants, including those who were not in the treatment group. Five email addresses were no longer viable, so a total of 41 surveys were sent out successfully. To encourage survey completion, entry into a drawing for a $50 gift card to Target was offered to those who filled out the survey in entirety by November 1st, 2013. A total of 29 surveys were received.

With the intention of getting the greatest number of surveys returned, the survey was kept short and to the point. After a few test-runs, it was determined that the survey could be completed in under ten minutes. This was beneficial because all of the study participants were employed women. The survey included questions on if the participant was still exercising, what their motivations or barriers to exercising were, what types of exercise they did, and how often they exercised at what intensity. The survey also included Likert scale questions that were meant to assess the participant's current levels of work-family conflict and their stress levels over the past eleven months, since the study's completion.

In the two Likert scale question sections of the survey, two different numerical scales were used. A scale of 1-7, with 1 being "strongly disagree" and 7 being "strongly agree" was used to assess the participants' perceived level of work-family conflict. On this 1-7 scale, participants were asked to choose whether their work interfered with their family life (1 if they strongly believed it did not at all, 7 if they strongly believed that it did) and other such questions. A scale of 0-4, with 0 being "never" and 4 being "very often" was used to assess the participants' perceived level of stress in the months since the completion of the study. On this 0-4 scale, participants were asked to rate how often they felt control of the important things in their life, or how often they had felt in control of their

personal life, and other such questions. These Likert scale responses were used to determine if there was a correlation between exercise habits and WIF/FIW and stress levels.

Once the surveys were received through SurveyMonkey, the results were entered into a MiniTab spreadsheet for statistical analysis. In MiniTab, total perceived work-family conflict levels and total perceived stress levels were measured. This was done by assigning values to the responses based on their direction on the scale and then summing the Likert scale numerals. For work-family conflict, the lower the sum, the lower the participant's levels of work-family conflict. For stress levels, the higher the value, the more often the participant felt in control and less stressed. Alternately, depending on how the question was phrased, work-family balance and frequency of stress and anxiety were also measured. After the data had been summed, 2-sample t-tests were used to determine statistical significance. This information was then formulated into a box plots.

Data on continued or discontinued exercise habits in members of either the treatment or control groups were also analyzed. Cross tabulation and Chi Square calculations were used to establish if there was statistical significance.

Also included in the survey, were questions about the original study. In an attempt to minimize answer bias, the participants were asked, at the end of the survey, if they remembered the study de-brief that had been sent out in January 2013. Back in January, it was unknown that a follow-up survey would be administered, otherwise the authors of the Zumba® study would not have divulged the purpose of the study in the study's de-brief, but instead would have waited until after the follow-up. But, since the study's de-brief was sent out, knowing whether the participants remembered the purpose of the study was important to the results. If the participant remembered the objective of the Zumba® study, she may have been more likely to be biased in her answers.

3. Results

The results of this survey are vague and not statistically significant, perhaps due to the small number of completed and returned surveys. However, some useful information can be gleaned from the results shown below in Tables 1 and 2 and Figures 1-7.

Table 1. continued exercise habits in treatment and control groups

	Number of Persons in Treatment Group	**Number of Persons in Control Group**	**Test Used**	**Statistical Significance ($p<0.05$)**
Exercising	9	9	Cross Tabulation and Chi Square	None
Not Exercising	6	4	Cross Tabulation and Chi Square	None

In Table 1, a greater number of participants from the control group are exercising, even though the results are not statistically significant. Interestingly, there are people from the control group who, since the completion of the original study, are now exercising. The ratio of those not exercising to those exercising is surprisingly greater in the treatment group participants than in the control group participants, although these results remain not statistically significant. It was hypothesized that a greater number of individuals from the group exercise treatment group would still be exercising.

Table 2. frequency of exercise among all participants

	.25				X
	.50			XXXXX	
	.75		XXX	XXXX	
Hours of Exercise	**1.00**			XX	X
	1.25				
	1.50	X		X	
		1	**2**	**3**	**4**
			Times per Week		

As shown in Table 2, the most common frequency of exercise for those who exercised is half an hour 3 times per week. The second most common frequency of exercise was for 45 minutes 3 times per week.

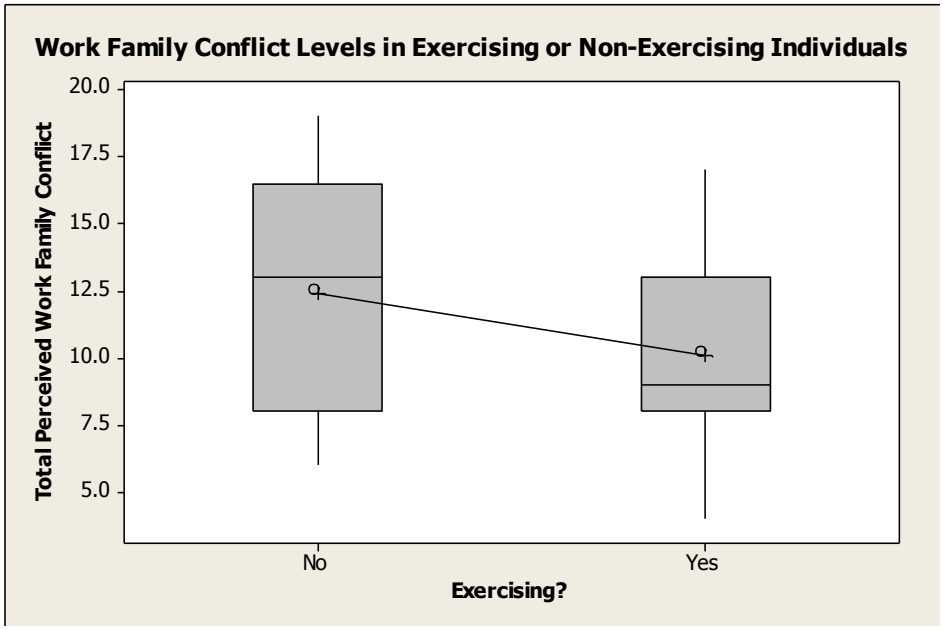

Figure 1. Exercising versus not-exercising participants' work-family conflict levels

Figure 1. Total numbers of both exercising and non-exercising participants who expressed differing levels of work-family conflict is illustrated above. There was no statistical significance (P-Value = 0.203, DF = 15). However, the observable levels of work-family conflict were slightly lower in exercising individuals than in non-exercising individuals.

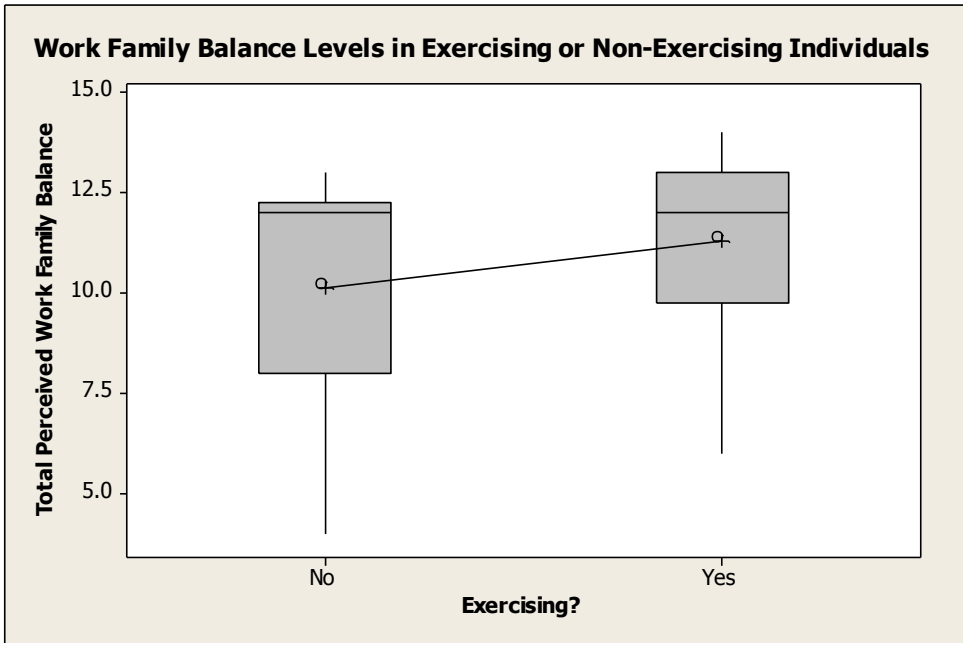

Figure 2. Exercising versus not-exercising participants' work-family balance levels

Figure 2. Total numbers of both exercising and non-exercising participants who expressed differing levels of balance within their work-family interface is shown above. There was no statistical significance (P-Value = 0.330 DF = 13). However, the observable levels of balance within the participants' work-family balance were slightly higher in exercising individuals than in non-exercising individuals.

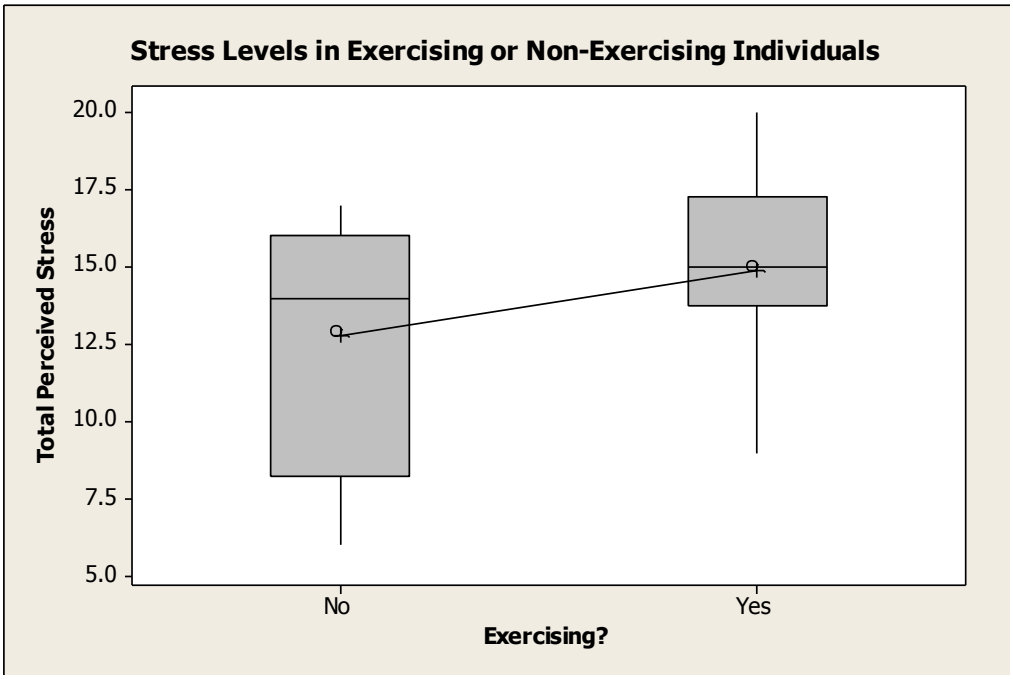

Figure 3. Exercising versus not-exercising participants' stress levels

Figure 3. Total numbers of both exercising and non-exercising participants who expressed differing levels of stressful situations in their lives is exemplified above. There was no statistical significance (P-Value = 0.183 DF = 13). However, the observable levels of stress were slightly higher in exercising individuals than in non-exercising individuals.

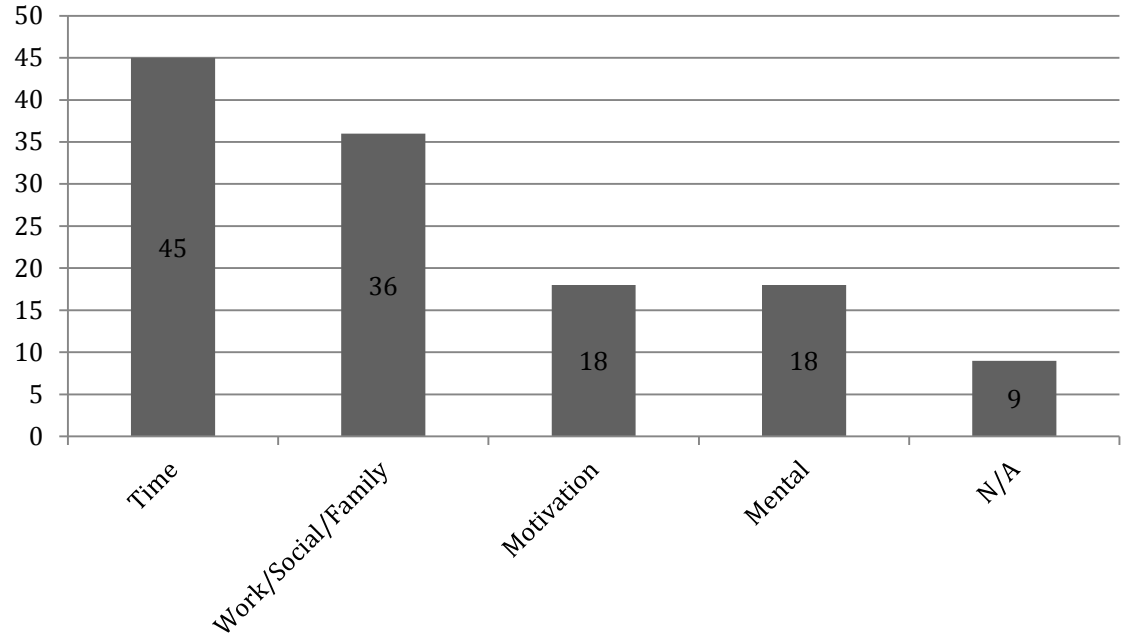

Figure 4. Obstacles to exercising among not exercising participants

Figure 4. Time was clearly the most prevalent obstacle, with 45% of non-exercising participants reporting that not having enough time prevented them from exercising. Work, social, and family obstacles were also relatively common, with 36% of non-exercising participants. The 9% or participants who reported "N/A" as a barrier to their ability to exercise are assumed to have no identifiable barriers.

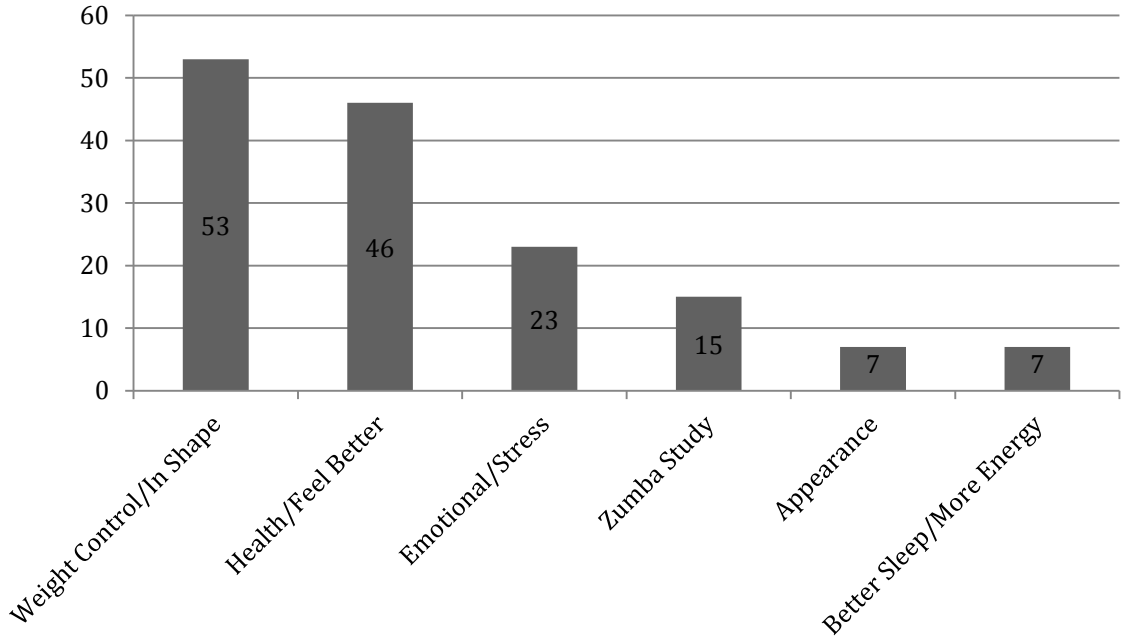

Figure 5. Motivation to exercise among exercising participants

Figure 5. Of all the expressed motivators to exercise among study participants, to stay in shape and control weight was the most common motivator, with 53% of exercising participants.

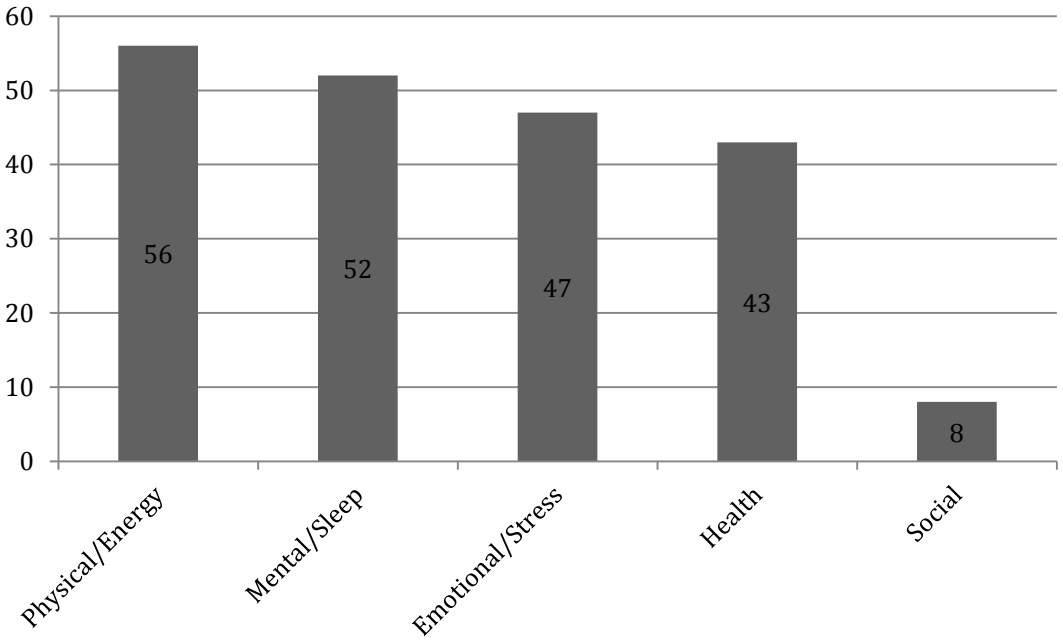

Figure 6. Perceived benefits of exercise among all participants

Figure 6. 56% of all participants reported that being in better physical health and having more energy were the greatest perceived benefits of exercise. However, mental health and better sleep at 52%, emotional well-being and decreased stress at 47%, and overall health at 43% were all popular motivators.

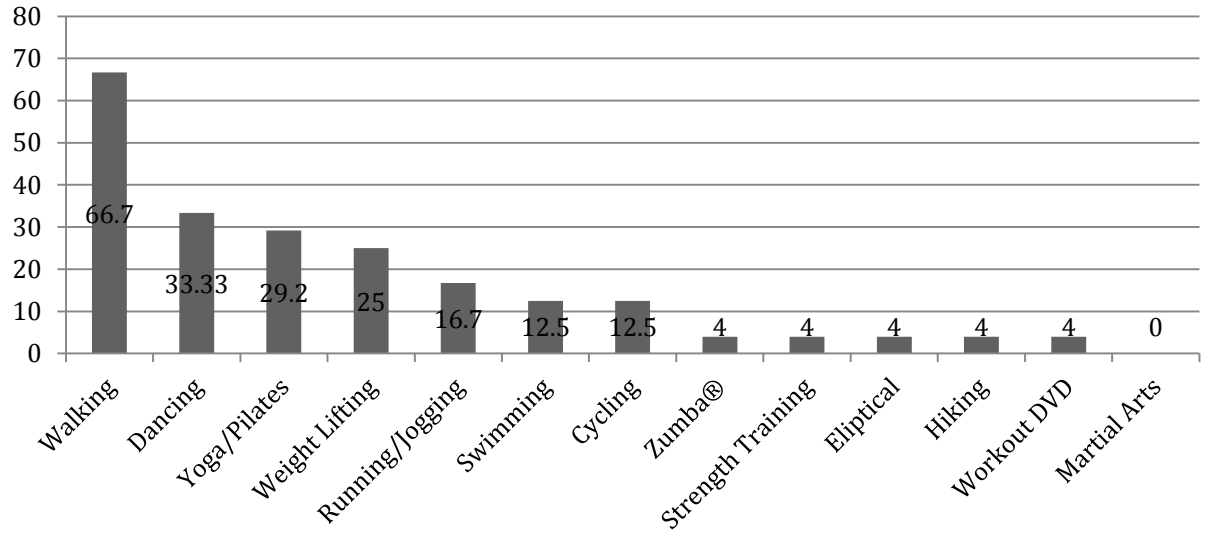

Figure 7. Types of exercise among all participants

Figure 7. Walking was the most common form of exercise among all study participants with 68.4% of all participants. Martial arts was an option given on the survey, however no participants claimed to do martial arts, thus it is displayed as 0%.

4. Discussion

The continuation of exercise habits in treatment group study participants was unfortunately lower than anticipated. With 6 out of 15 total treatment group participants no longer exercising, the ratio of non-exercising participants from the treatment group to the number of exercising participants from the treatment group was surprisingly high. This high ratio may be due to the small sample size of the returned surveys, a factor that influenced the statistical significance of this study's findings, but it may also be due to something more psychological.

A possible explanation for the low retention of exercising individuals from the treatment group may be the lack of a social support system motivating them to continue. Interest in maintaining an exercise routine is largely based on the goal of remaining healthy and fit and feeling mentally and emotionally equipped, something that social support systems can provide[11, 12]. In Coghill and Cooper's (2009) study, it was found that health was the main motivator behind the desire to exercise[11]. Interestingly, they found the main barrier to exercising being a lack of social support[11]. These results were similar to those found in the study by Korkiakangas et al (2011)[12]. It was found that in addition to health being a motivator to exercise, social relationships and positive relationships were significant motivators as well[12]. These results are based on the same age group as the Zumba® study and both expressed statistically significant results in comparison to their non-treatment groups. Perhaps in the current study's results, the discontinuation of exercise habits in treatment group study participants was due to the lack of a continued, positive, social support group (i.e. the weekly group Zumba® classes). Another explanation for the lack of retention may be that the 4-week Zumba® class, from the experiment by Clayton et al, was not long enough or frequent enough to build a social support system and gain the necessary self-efficacy to continue exercising outside of the parameters of the experiment.

One interesting finding of this study was the unanticipated number of individuals from the control group that began and maintained regular exercise habits after the completion of the initial experiment. The number of participants from the control group who were still regularly exercising was equal to the number of participants from the treatment group. Additionally, the ratio of exercising individuals to non-exercising individuals was higher than the ratio from the treatment group. All of these results, however, remain statistically insignificant.

Frequency and duration of exercise were other points of interest in the follow-up survey. While they have little bearing on the results of the study itself, they are interesting and may be applicable to the mitigation of stress and WIF/FIW in exercising individuals. Something to be investigated in future research may be weighing the relationship between the levels of WIF/FIW and stress in individuals who exercise for longer blocks of time less often during a week against those individuals who exercise for shorter periods of time more often during the week.

The lower levels of work-family conflict found in the analysis of exercising individuals follows the findings in the original study by Clayton et al[10]. While this finding is not statistically significant, it is promising. The higher levels of balance between work and family spheres observed in the survey findings also follow the findings of the Zumba® study. So, while the results of these t-tests were not statistically significant, they strengthen the association between exercising and a more harmonious work-family interface.

The original hypothesis that those who have continued to exercise will exhibit lower stress levels than those who have not was not upheld. The observable levels of stress found in exercising individuals were slightly higher than those observed in non-exercising individuals. This finding, although not statistically significant, does not correlate to the anticipated findings of this research. Due to a small sample size, this result cannot be given credence, but is however important to note.

Following the initial hypothesis put forth at the initiation of this study, time was a noteworthy barrier to individuals. All participants in the original study and in this one were all working women with full or part time jobs. It can be assumed, then, that a large portion of their daily schedules was allotted to time spent at their place of employment, thus leaving less time to exercise afterwards. To help alleviate this conflict in interest, of those who want to exercise but may not have the time due to work, Clayton et al is proposed that their employers offer a way to exercise at the work place during the work day[10]. This would give the women a chance to work towards reducing their WIF/FIW levels and be able to focus more on their personal life after the workday concluded. Some suggestions that Clayton et al had were to engage in walking meetings or to have access to on-site exercise facilities[10]. These efforts may help decrease the prevalence of time as a barrier to exercising.

Controlling and maintaining a healthy weight, staying in shape and overall health were all expressed as motivators to exercise. Looking back at the original study, where one of the objectives was to link exercise to psychological well-being, participants who reported emotional well-being and stress mitigation as motivators was not surprising. What was surprising was that stress relief, previously anticipated to be the greatest motivator for exercising participants, was not, with only 23% of participants reporting this as a motivator. A surprisingly low number of participants claimed the Zumba® study to be their motivator for exercising, with only 15% of participants. It was thought that the Zumba® Study would have played a larger role in participants' motivation to continue to exercise. However, the Zumba® study was not offered as a choice answer and was written in to the "other" section of the survey.

A substantial number of participants reported that physical wellness, increased energy levels, mental functioning, better quality sleep, emotional wellbeing, and stress reduction were all benefits of exercising. Most respondents didn't just identify one benefit of exercising, but instead listed many of the aforementioned in their answers. In contrast, social benefits were mostly disregarded. This again could be due to the perception of a lack of social support in their creation of an exercise routine, or to a possible lack of social support formed during the Zumba® study.

Different forms of exercise were another data set collected in the follow-up survey. While not interested in the statistical significance of these findings, the results are interesting and meaningful nonetheless. Walking was by far the most common form of exercise. Dancing, a form of exercise similar to Zumba®, was the second most frequently reported exercise type. Martial arts was given as a choice in the survey, but no subjects reported that they participated in the martial arts, which is why it is reported as 0% in Figure 7.

In conclusion, none of the results from this follow-up survey were statistically significant. This lack of statistical significance is most likely due to the small sample size allotted by the returned, completed surveys. Despite the absence of statistical significance, correlations and associations with results from the Zumba® study are apparent, with exception to stress levels in exercising subjects. It is suggested, that in the future, the link between frequency and duration of exercise and WIF/FIW and stress levels is investigated, as that may be fodder for some interesting results. Additionally, a larger sample population to possibly achieve statistically significant results would strengthen the foundation for the efficacy of using exercise to mitigate stress and WIF/FIW in long-term follow-up studies.

5. Acknowledgements

Thanks to Russell Clayton, Micheal Stratton, Leah Mathews, and Ellen Garrison for the opportunity and encouragement to undertake this follow-up survey analysis. Thanks to Irene Rossell and Cathy Whitlock for the knowledge and assistance in completing and enhancing my figures and statistical analyses. Thanks to Rebecca Reeve and the North Carolina Center for Health and Wellness for their generous funding and ongoing support of undergraduate students. Thanks to Dr. Aubri Rote for her knowledge and research assistance. Additional thanks are extended to the University of North Carolina Asheville for the atmosphere and support in completing my undergraduate research.

6. References

1. J.H. Greenhaus & N.J. Beutell, "Sources of Conflict Between Work and Family Roles," *Academy of Management Review* 10, (1985) 76-88.

2. Tammy Allen and Jeremy Armstrong, "Further Examination of the Link Between Work-Family Conflict and Physical Health: The Role of Health-Related Behaviors," *American Behavioral Scientist* 49, no. 9 (2006): 1204, http://abs.sagepub.com/content/49/9/1204.full.pdf+html.

3. Centers for Disease Control and Prevention, "Chronic Diseases and Health Promotion," 2012, http://www.cdc.gov/chronicdisease/overview/index.htm.

4. Tarani Chandola, Eric Brunner & Michael Marmot, "Chronic Stress at Work and the Metabolic Syndrome: Prospective Study," *BMJ* 332, (2006).

5. Bonita C. Long & Rosemary Van Stavel, "Effects of Exercise Training on Anxiety: A Meta-Analysis," *Journal of Applied Sport Psychology* 7, (1995): 167-189.

6. A. Head, M.J. Kendall, R. Ferner & C. Eagles, "Acute Effects of Beta-Blockade and Exercise on Mood and Anxiety," *BR J Sports Med* 30, (1996): 238-242.

7. K. Forcier, L.R. Stroud, G.D. Papandonatos, B. Hitsman, M. Reiches, J. Krishnamoorthy & R. Niaura, "Links Between Physical Fitness and Cardiovascular Reactivity and Recovery to Psychological Stressors: A Meta-Analysis," *Health Psychology* 25, (2006): 723-739.

8. Walter Ensel & Nan Lin, "Physical Fitness and the Stress Response," *Journal of Community Psychology* 32, no. 1 (2004): 81-101.

9. Peter Salmon, "Effects of Physical Exercise on Anxiety, Depression, and Sensitivity to Stress: A Unifying Theory," Clinical Psychology Review 21, no. 1 (2001): 33-61.

10. Russell Clayton, Micheal Stratton, Leah Mathews & Ellen Garrison, "The Effect of Exercise on the Work-Family Interface: A Field Experiment Using Group Exercise Classes," (2013): 1-33.

11. Nikki Coghill & Ashley Cooper, "Motivators and De-motivators for Adherence to a Program of Sustained Walking," *Preventive Medicine* 49, (2009): 24-27.

12. Eveliina Korkiakangas, Anja M. Taanila & Sirkka Keinanen-Kiukaanniemi, "Motivation to Physical Activity Among Adults With High Risk of Type 2 Diabetes Who Participated in the Oulu Sub-study of the Finnish Diabetes Prevention Study," *Health and Social Care in the Community* 19, no. 1 (2011): 15-22.