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Links Between Religiously-Focused Exercise and Body Shape Preoccupation Among Young Adults

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I would like to acknowledge Kathryn Linehan, creator of FORM, for her vision for integrating spiritual formation with movement meditation. I thank Justin Barrett for his valuable insight and feedback. Finally, I thank Joel Carpenter, Mary Bennett, and Mike Hamilton for organizing the seminars at Calvin College and capstone conference that helped shape this project.

Abstract

This quasi-experimental study examined whether engaging in physical exercise integrated with a Christian religious focus would result in decreased body shape preoccupation and improved mental and emotional health. Data were collected at the beginning and end of an 8-week period from female and male college students in three conditions: (1) group exercise sessions integrating an explicit religious focus, (2) standard group exercise, and (3) a control condition without activities. The religious exercise group decreased in body shape preoccupation to a greater extent than the control group, but the groups did not differ in other psychological symptoms or affect. This offers an initial indication that integrating a religious focus with exercise may potentially offer a unique method for addressing body shape preoccupation that is not accounted for by improvements in mental health or affect. If confirmed through additional research, infusing a religious focus into exercise regimens might inspire a practical, inexpensive method of targeting body shape dissatisfaction among young adults.

Keywords: body shape preoccupation, exercise, body image, religion, spirituality

Links Between Religiously-Focused Exercise and Body Shape Preoccupation Among Young Adults

Preoccupation with body weight or shape has long been acknowledged as a common phenomenon among young women in the general population (Cooper, Taylor, Cooper, & Fairburn, 1986) and has become cause for concern among young men as well (Griffiths, Angus, Murray, & Touyz, 2014). Exposure to sociocultural images and attitudes about appearance have been associated with decreased body satisfaction and, consequently, lower self-esteem (Clay, Vignoles, & Dittmar, 2005). Furthermore, body dissatisfaction is a risk factor for negative affect, dieting, and eating pathology (Stice, 2002). This speaks to the need to target body shape dissatisfaction, especially among adolescents and young adults (Clay et al., 2005). The current study examined religiosity and pilates/yoga-style exercise as potential points of intervention for body shape preoccupation.

Exercise and Body Image

Research has demonstrated that exercise can lower body dissatisfaction. Two primary mechanisms may be that exercise can result in a physique that is closer to one's aesthetic ideal and exercise can increase psychological well-being, which is related to body image (Hausenblas & Fallon, 2006). A meta-analysis of 121 published and unpublished studies indicated with small effects that exercise is related to more positive body image (Hausenblas & Fallon, 2006). However, aerobic activity and exercise of a moderate to strenuous nature primarily accounted for these links, rather than nonaerobic and less strenuous exercise categories such as pilates and yoga.

The focus here is on yoga/pilates research conducted among nonclinical samples. A small number of studies have assigned participants to engage in a yoga program, most finding no links

between practicing yoga and change in levels of body satisfaction. For example, a study that examined changes in body satisfaction among men and women participating in a two-week yoga program involving postures, breathing, and body awareness exercises found no change in body satisfaction (Rani & Rao, 2005). In another study, college women dissatisfied with their bodies were randomly assigned to a yoga group, a body dissatisfaction discussion group, or a control group. While those in the discussion group decreased in body dissatisfaction, those in the yoga group did not experience changes in comparison to the control group (Mitchell, Mazzeo, Rausch, & Cooke, 2007).

Research has also compared individuals who engage in yoga/pilates in their daily lives to those who engage in other forms of exercise. Of this research, only one study was located that included pilates participants, finding that when body-mass index and weekly hours of physical activity were controlled in analyses, young men and women who participate in yoga or pilates were equally dissatisfied with their bodies as those who did not engage in yoga or pilates (Neumark-Sztainer, Eisenberg, Wall, & Loth, 2010). Research focusing exclusively on yoga has offered mixed results with regard to links to body satisfaction (e.g., Daubenmier, 2005; Zając & Schier, 2011). Perhaps because the relationship between yoga and body satisfaction depends on the extent to which yoga incorporates an emphasis on the mind through activities such as meditation, breathing, mindfulness, and chanting. This was supported by a cross-sectional comparison finding that women who engaged in yoga with a medium emphasis on the mind showed greater body part satisfaction than women who engaged in yoga with a low emphasis on the mind (Delany & Anthis, 2010). Interestingly, those engaging in yoga with a high emphasis on the mind did not score significantly differently from either other group. This suggests the importance for research on this topic to clarify whether elements of yoga other than body

postures and movement were practiced, such as breathing techniques or meditation.

In addition, because yoga has roots in Buddhism and Hinduism and is a historic and current practice in many world religions, it can be deeply religious for some. A recent study indicated that individuals seem to adopt yoga primarily for exercise and stress relief, but that those who change their reason for practicing yoga over time are most likely to indicate spirituality as their new reason (Park, Riley, Bedesin, & Stewart, 2016). Furthermore, Dittman and Freedman (2009) found that women who practiced yoga for religious reasons reported higher levels of body satisfaction than women who engaged in yoga for physical or appearance motivations. Thus, links between yoga and body image could, for some, result from a religious experience that takes place during yoga practice.

Religion and Body Image

Religion is widespread in American society. For example, Gallup interviews with randomly selected Americans indicated that approximately 90% believe in God and 84% claim a religious identity (of whom 95% identified as Christian; Newport, 2012). This raises the question of whether religion may be an untapped resource for addressing body dissatisfaction. Despite hundreds of studies establishing links between religion and mental health (Koenig, King, & Carson, 2012), religion has rarely been studied as a mechanism for minimizing body image concerns. For this study, the term religion is used to refer to beliefs and practices related to the sacred, within or outside of a traditional religious context (Miller-Perrin & Krumrei-Mancuso, 2015).

Research to date regarding links between religion and body shape concerns among nonclinical samples has provided conflicting results. For example, among highly religious first-year college students, religion was related to lower body surveillance among men, but was not

related to body image for women (Hayman et al., 2007). However, among larger samples of college women, relationships have been observed between the nature of religion and desire for thinness. Specifically, a personal pursuit of religion for its own sake has been associated with less desire for thinness (Forthun, Pidcock, & Fischer, 2003). On the other hand, being involved in religion primarily to reach non-religious goals has been associated with greater desire for thinness (Forthun et al., 2003; Smith, Richards, & Maglio, 2004).

In addition, links between religion and body shape concerns can differ by age. Among young female college students (mean age = 18.5 years), valuing religious doubt was related to higher body dissatisfaction, whereas among slightly older female college students (mean age = 21 years), openness to religious change was related to higher body dissatisfaction (Boyatzis & McConnell, 2006). None of these links were observed among recent female college graduates (mean age = 25 years). Further, among a large U.S. national sample of men and women with an average age of 45 years (*SD* = 12.5 for men and 14.3 for women), greater religiosity was associated with underestimating one's weight, independent of body-mass index (BMI) and demographic factors (Kim, 2007).

One theory, postulated by several scholars, is that preoccupation with one's body shape represents an attempt to satisfy unmet religious needs (see Richards, Weinberger-Litman, Susov, & Berrett, 2013, for review). This raises the question whether religion can be a point of intervention for minimizing body shape concerns. According to the theory of body shape preoccupation as a pseudo-religious pursuit, focusing on religion grounded in the sacred, rather than idealizing and striving toward a certain body shape, may alleviate body shape preoccupation. Research among college women has demonstrated that having a secure attachment to God is associated with less body dissatisfaction (Homan & Boyatzis, 2010).

Research has suggested that feeling loved and accepted by God serves to minimize the effects of pressure to be thin, thin-ideal internalization, and exposure to extremely thin models in increasing body dissatisfaction (Homan, & Boyatzis, 2010; Homan, 2012). Thus, it seems that one's religion might be able to buffer against the negative effects of sociocultural images and personal attitudes about thinness. This was also supported by qualitative interviews with 15 female college students classified as having positive body image, among whom 12 described that their religion and/or spirituality helped them have a positive body image (Wood-Barcalow, Tylka, & Augustus-Horvath, 2010). The women emphasized that they derived a positive body image from being designed as special by a higher power and being unconditionally loved and accepted by a higher power.

Similarly, qualitative (Boyatzis, Trevino, Manning, & Quinlan, 2006; Smith-Jackson, Reel, & Thackeray, 2011) and quantitative (Jacobs-Pilipski, Winzelberg, Wilfley, Bryson, & Taylor, 2005) research among young women has indicated that religion offers unique and effective methods for coping with body shape concerns (e.g., through prayer, meditation, reading religious texts, and thinking about God), but that women do not often spontaneously draw upon their religion to cope with body concerns. Few participants could explain this contradiction, but some noted that the pervasiveness of pressure to be thin in society often made it difficult to remember core religious values (Smith-Jackson et al., 2011). Therefore, programming may be helpful for encourage young adults to draw on the religious resources already available to them for combatting body shape concerns. This idea is supported by the findings of an experimental study among college women, that reading about God's love and acceptance of one's body resulted in more positive body esteem after viewing photos of thin models than reading material unrelated to God or body (Boyatzis, Kline, & Backof, 2007). Unfortunately, experimental

research and between-group comparisons are rare, leaving the question open as to whether religion has a causal impact on individuals' views of their bodies (Boyatzis & Quinlan, 2008).

A possible explanation for the mixed research findings thus far regarding links between religion and body concerns, is that individuals may differ in the extent to which they compartmentalize versus integrate their religious beliefs into their views of their bodies. A study of female and male college students indicated that viewing one's body as sacred was associated with greater body satisfaction, beyond the variance attributable to general religiousness (Mahoney et al., 2005). Thus, integrating religion into one's experience of one's body may be crucial for religion to benefit body satisfaction.

Theoretical Foundation for Religiously-Focused Exercise

The current study combines previous research findings that (1) religion offers beliefs, values, and practices that can be associated with positive body image and (2) exercise can be associated with increased body satisfaction. This study builds on the theory that shifting one's focus from idealizing a certain body shape toward focusing on religion grounded in the sacred is a way of finding purpose and value in life, which may alleviate body shape preoccupation (Richards et al., 2013). The underlying mechanisms for decreasing body shape preoccupation may be forming a closer connection to God, feeling loved and accepted by God, and turning to one's faith to cope with body shape concerns. The current study examined a program designed to shift focus toward worshiping God and living out a greater purpose, which presumably would reduce the mental priority participants placed on body shape concerns.

The unique component of theory offered in the present study is the integration of religious beliefs and values with one's physical sense of body and movement. Some have suggested that physical practices such as yoga allow individuals to become more in tune with

how their bodies feel than how they look (Boudette, 2006; Douglass, 2009). One avenue for achieving integration between religion and the body may be to engage in religious practices that directly incorporate the body, such as movement meditations that have an explicitly religious focus. J. Barrett theorized that religious movement meditation may allow body movements and postures in daily life to cue memory of religious principles meditated upon during movement meditation, bolstering psychological health through this integration of religious understanding into daily life (personal communication, July, 2011).

The Current Study

The goal of the current study was to examine whether combining an explicitly Christian religious meditation with a physical practice of pilates/yoga movements would function as a novel method of integrating one's religion into one's experience of the body, resulting in a decrease in body shape concerns among young adults to a greater extent than group exercise alone. This is based on the theory that developing a religiosity centered in the sacred, that is integrated with one's sense of self, would offer purpose and value in life that detours attention from body shape preoccupation. To date, this theory has never been studied with integration of physical movement. To be clear, the hypothesized mechanism of change in this study is the integration of body movement with meditation on biblical scriptures, and does not involve lecturing or coaching on the biblical passages or associated views of the body. Examples of integration of scripture with body postures and movements are the combination of strengthening postures and exercises with a focus on texts emphasizing the strength and sovereignty of God (e.g., Isaiah 40) and the combination of calming breathing techniques with biblical passages focused on God as a shepherd who takes care of one's needs and whose presence banishes fear and brings goodness and love (e.g., Psalm 23).

A quasi-experimental design was used to examine group differences between three conditions assessed at a baseline (Time 1; T1) and after eight weeks (Time 2; T2). It was hypothesized that engaging in group physical activity sessions and engaging in group sessions integrating physical activity with religious meditation would both be associated with decreased preoccupation with body shape in comparison to a non-activity control group, but that the effects would be greatest for the religiously-focused physical activity group. Thus, the exercise group served as a second control to examine whether an integration of religious focus with body movements would provide benefits beyond standard group exercise.

Given that religion can minimize not only body shape concerns, but also general psychological disturbances (e.g., Boyatzis, et al., 2007; Smith, Hardman, Richards, & Fischer, 2003), and given that exercise can be related to improved mood (e.g., Streeter et al., 2010), a second goal of the study was to examine whether religiously-focused exercise would result in improvements in mental health and affect, and if so, whether these links would account for any improvements in body image. It was hypothesized that both exercise groups would show improvements in psychological symptoms and affect in comparison to the control group, and that the positive effects would be largest for those in the religiously-focused exercise group. Finally, it was hypothesized that integrating religious meditation with body movements would decrease body image concerns even after taking into account any effects attributable to psychological health and affect.

Method

Participants

The sample consisted of 113 college students (82% female) at a small, Christian, Liberal Arts University. Participants ranged in age from 18 to 30 years, with 31% being first-year

students, 15% sophomores, 21% juniors, and 33% seniors. Participants were 61% Caucasian, 15% Asian, 14% multi-racial, 3% African American, 3% Hispanic, and 5% "other." They reported annual household incomes of: 15% less than $30,000; 18% between $30,000-60,000; 17% between $60,001-90,000; 17% between $90,001-120,000; and 27% more than $120,000. The sample was predominantly Christian (85%), with 12% identifying with a different religion and 3% reporting they identified with no religion. See Table 1 for additional descriptors.

Design

A brief longitudinal, between-subjects design compared change in body shape preoccupation, psychological symptoms, and affect for participants in three conditions: (1) eight weekly group exercise sessions with religious focus, (2) eight standard weekly group exercise sessions, and (3) an 8-week control period without group sessions. Participants self-selected into the conditions. Both exercise conditions were of the same format and length and involved a focus on mat work, core strengthening, breathing, alignment, and stretching. The religiously-focused exercise condition integrated religious meditation on texts from the Bible throughout the sessions. This involved listening to, reciting, meditating on and/or praying Christian Scriptures while engaging in physical exercises. The scripture meditation was integrated with the movement pattern, connecting words and phrases from the biblical texts with specific movements and body positions. Key biblical passages and themes included: Psalm 23 (calming and centering), Isaiah 40 (strengthening), Matthew 22 (agility), Matthew 5 (freedom), Matthew 6 (renewal), and Matthew 7 (meditation). Thus, the religious emphasis was not focused on body shape or self-acceptance; rather the overarching focus was on fostering spiritual growth through a deeper connection with God.

On a theoretical basis, a number of covariates were included in the analyses. Age was

controlled because previous research has shown that links between religion and body satisfaction can differ by age (Boyatzis, & McConnell, 2006). Given that data were collected in an affluent part of the nation, income was also included as a control variable. Because participants might engage in exercise and/or religious meditation outside of the study interventions, amount of time spent exercising and engaging in religious mediation over the course of the study were also controlled. Finally, given that participants were not randomly assigned to groups, preexisting levels of religiosity, spirituality, body shape preoccupation, psychological symptoms, negative affect, and positive affect were controlled.

Measures

Body Shape Questionnaire (BSQ). A validated, eight-item version of the BSQ (Evans & Dolan, 1993) was used to assess negative body shape preoccupations. This measure was first validated among community samples and a clinical sample of women (Cooper, et al., 1986), but has also been used among men (e.g. Koenig, & Wasserman, 1995; Striegel-Moore et al., 2009). Participants rated how they had been feeling about their appearance on a scale from 1 (*never*) to 6 (*always*). A sample item is: "Have you not gone out to social occasions (e.g. parties) because you have felt bad about your shape?" Items were summed to create a total score for preoccupation with body shape. Total scores can range from 8 to 51, with higher scores reflecting greater preoccupation with one's body shape. In the present study, scores ranged from 8 to 48 at both time points and Cronbach's α at T1 was .94 and at T2 was .93.

Brief Symptom Inventory (BSI). The 53-item BSI (DeRogatis, 1993) was used to assess psychological symptoms, covering the dimensions of somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Items were rated for intensity of symptoms on a 5-point scale ranging from 0 (*not*

at all) to 4 (*extremely*). Cronbach's α at T1 was .95 and at T2 was .96. Given that this study was conducted among a normative sample of college students, the positive symptom total (PST) was selected as a sensitive measure of psychological symptoms. The PST consists of a tally of the number of items endorsed at a level higher than zero. The PST can range from 0 to 53, with higher scores reflecting more psychological symptoms. In the present study, scores ranged from 0 to 42 at T1 and from 0 to 53 at T2.

Positive and Negative Affect Schedule (PANAS). The 20-item PANAS was used to assess affect (Watson, Clark, & Tellegen, 1988). Participants were instructed to indicate the extent to which they felt 10 positive (e.g., "enthusiastic") and 10 negative (e.g., "distressed") emotions during the previous week using a five-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*). Items for each affect were tallied to create a total score reflecting more intense affect, with possible scores ranging from 10 to 50 for each scale. In this study, scores ranged from 10 to 45 and from 10 to 36 for negative affect at T1 and T2 respectively and from 10 to 50 and 11 to 50 for positive affect at T1 and T2 respectively. Cronbach's α for positive affect was .92 and .93 at T1 and T2 respectively and was .83 for negative affect at both T1 and T2.

Demographic, religious, and personal variables. Demographic data were gathered, including participant's age, gender, class standing, household income, and religious affiliation. Religious beliefs and behaviors were assessed, including self-rated levels of religiousness and spirituality, belief in God, frequency of religious service attendance and prayer, and amount of time spent in religious meditation. Additional personal data were gathered, including amount of time spent exercising, whether the participant was receiving any medical treatment for health problems, and whether the participant was receiving any treatment for psychological difficulties (medication or psychotherapy).

Procedure

Following Institutional Review Board approval, participants in both exercise conditions were recruited from University physical education courses and offered $5 gift cards for participating. Control participants were enrolled in a psychology course and received class credit for participating. Students were only eligible to participate in one study condition; therefore, no participants were represented in the study more than once.

Students in the two exercise conditions completed measures within a week before commencing the group exercise program and within a week following the 8th exercise session. The control group participants completed measures in the same timeframe, but engaged in no organized activities between assessment points.

Consistent with intent-to-treat analysis, participants were retained in the study even if they missed group sessions during the intervention period. However, given that only two data points were used, individuals who did not complete the T2 assessment were removed from the study (16.78% of sample). Before analyzing the data, participants with excessive missing information across all variables of interest (body shape preoccupation, psychological symptoms, and affect), were removed from the dataset (5.31% of sample). This resulted in the final sample of 113 participants.

Results

Preliminary Analyses and Descriptive Information

All participants completed their respective programs and missed no more than one of the eight group sessions. Retention for completion of T2 measures was 83.22% of T1 participants. Of those who completed both assessments, 94.69% provided complete data on the primary study variables. Analyses of variance and chi-square analyses (Cramer's V) did not reveal any

differences in demographic or personal characteristics or study condition between participants' whose data were retained and those whose data were lost due to attrition or blanks.

Descriptive information of the sample is displayed in Table 1. Analyses of variance for continuous and ordinal variables and chi-square analyses for nominal variables were used to examine whether the three groups differed from one another at the start of the study with regard to demographic variables, religiosity, personal characteristics, and psychological variables (Table 1). The only observed differences between groups were for age and class standing. The groups did not significantly differ from one another at the beginning of the study in gender, household income, religious affiliation, self-rated levels of religiousness or spirituality, belief in God, frequency of religious service attendance or prayer, amount of time spent in religious meditation or exercising, frequency of treatment for physical or mental health problems, psychological symptoms, positive or negative affect, or body shape preoccupation.

Group Comparisons of Change in Psychological Variables from T1 to T2

A multivariate analysis of covariance (MANCOVA) with Bonferroni correction was used to examine whether the groups experienced different amounts of change on psychological variables over the course of the study (Table 1). Each model controlled for baseline measurement of all psychological variables. An *a priori* decision was made to control for age, household income, religiosity, spirituality, and amount of exercise and meditation over the course of the study. Model 2 displays the proposed analyses, with all *a priori* control variables included.

The results indicated that the groups differed in the amount of change experienced in body shape preoccupation, with those in the religiously-focused exercise group experiencing a reduction in body shape preoccupation compared to the control group, with a medium effect size ($\eta_p^2 = .11$; Cohen, 1988). Effect sizes are reported as partial eta-squared, due to the inclusion of a

number of covariates within the proposed model (Cohen, 1973). For comparison purposes, eta-squared was .10 for model 1, which did not include covariates.

Post-hoc analyses indicated that those in the religiously-focused exercise group experienced a significant decrease in body shape preoccupation, whereas those in the standard exercise group did not change significantly in body shape preoccupation, and those in the control group increased significantly in body shape preoccupation. Figure 1 displays group changes in body shape preoccupation from T1 to T2 with raw data and Figure 2 displays the same including control variables.

In Models 1 and 2, the groups did not differ from one another in the amount of change experienced in psychological symptoms or positive or negative affect (see Table 1). Therefore, it was not necessary to examine whether psychological health or affect functioned as mediators between group condition and body shape preoccupation. The only significant within-group changes in psychological symptoms and affect were that the religiously-focused exercise group significantly decreased in negative affect and the control group significantly increased in psychological symptoms over the course of the study.

To verify that changes in body shape preoccupation within the religiously-focused exercise group were not the result of changes in negative affect, T2 negative affect was added as a covariate (Model 3). The pattern of results remained the same for significant group differences in changes in body shape preoccupation, with the religiously-focused exercise group decreasing in body shape preoccupation to a greater extent than the control group. In addition, changes in psychological symptoms became significantly different between groups, with the control group increasing significantly more in psychological symptoms than the religiously-focused exercise group.

Discussion

This quasi-experimental study compared change in body shape preoccupation, psychological symptoms, and affect among three groups assessed at the beginning and end of an 8-week intervention period. At the start of the study, the groups did not differ from one another in any of the variables of interest. Nevertheless, due to the lack of random assignment between conditions, conservative analyses were used that controlled for demographic factors, total amount of time spent in religious meditation and exercise, and participants' levels of religiosity, spirituality, and previous body shape preoccupation, psychological symptoms, and positive and negative affect.

The results provide preliminary insight into religiously-focused exercise as a possible mechanism for minimizing body shape preoccupation among young adults. Fitting with expectations, those in the religiously-focused exercise group experienced a significant decrease in body shape preoccupation and differed significantly from control participants, offering partial support for the hypothesis that physical exercise with a religious focus may offer a unique activity to target body image concerns. This difference was not attributable to pre-existing differences in participants' body shape preoccupation, psychological symptoms, positive or negative affect, general levels of religiosity, spirituality, or demographic factors; nor was the difference attributable to improved mood or psychological health occurring over the course of the intervention. The moderate effect size ($\eta_p^2 = .11$) is substantial compared to previous prevention programs for body dissatisfaction, which have generally produced small effects (Stice & Shaw, 2004).

Young adults are constantly surrounded by cultural messages about the importance of appearance and body shape. The finding that the religiously-focused exercise group was the only

of the three study groups to decrease in body shape preoccupation fits with the theory that focusing on religion grounded in the sacred may minimize a pseudo-religious pursuit of an ideal body shape (Lelwica, 2010). Focusing on religion may offer deeper and more meaningful messages about identity that serve as an antidote to cultural messages about the body.

The fact that the findings persisted when controlling total amount of time spent in exercise and religious meditation offers a preliminary indication that there may be something unique about the integration of religious meditation and physical movements for improving body satisfaction. A possible interpretation is that connecting a religious focus with body postures allows unique motor encoding of religious principles that solidify a greater acceptance of one's body shape. Combining a focus on religious principles such as finding peace, strength, forgiveness, and renewal through one's connection to God with physical exercise may bring these religious principles to mind in one's daily life, when taking on a body posture or movement that has been paired with a particular religious principle during the religiously-focused exercise. Thus, integrating religious focus into physical exercise may offer a solution to the dilemma observed in previous research, that individuals find religion to be an effective mechanism for coping with body image concerns, but that they often do not think to drawn on this resource when experiencing distress about their bodies (Boyatzis & Quinlan, 2008). By engaging in religiously-focused exercise, a person's movements throughout daily life might help him/her recall religious concepts that are effective for coping with daily body image stressors. Further research is needed to rule out general coping, group support, or existential meaning as potential alternative mechanism of change that may have contributed to the current results.

An initially surprising result was that the control group increased in body shape preoccupation over the course of the study. However, this is not inconsistent with research

indicating that negative body image is extremely prevalent among college students. For example, Neighbors and Sobal (2007) found that 87% of college women of normal weight desired to weigh less. College men also expressed body weight and shape dissatisfaction, with 68% wanting to either lose or gain weight. Smith-Jackson et al. (2011) concluded that body image concerns have become a normative part of the college experience. One possibility is that participants in the control group increased in body shape concerns because pressures to have a certain body shape or size are pervasive in college communities. If it is the case that college tends to be a period of time in which preoccupation with body shape increases, the control participants may have been on a normative student trajectory, and those in the in the religiously-focused exercise condition may have been buffered from this norm by the intervention. Body image concerns among participants may also have been exacerbated by increases in stress, as T2 measures were completed during a hectic time in the academic semester, whereas T1 measures were completed at the beginning of an academic semester. This may have also contributed to the finding that control participants reporting more psychological symptoms at T2 than at T1, which could have exacerbated body image concerns. Again, those in the religiously-focused exercise group may have experienced stress-buffering effects.

Even though the religiously-focused exercise group was the only group to significantly decline in body shape preoccupation, the change did not differ significantly from the standard exercise group. This limits the strength of the conclusions that can be drawn about the religiously-focused exercise intervention. However, because the data trended in the predicted direction, perhaps the relatively small sample size did not provide enough power to reflect a significant difference between the standard exercise group and either other group.

There are numerous potential explanations for the fact that the standard exercise group

did not change in body shape preoccupation over the course of the study. First, many of the participants in the study were not sedentary before the intervention began. Those in the standard exercise group spent an average of 4.69 hours per week exercising before the start of the study, which did not differ significantly from the amount of time those in the other groups exercised prior to the start of the study. Thus, exercise may not have had as powerful of an effect in this study compared to studies in which participants go from little or no exercise to regular exercise. A second possibility consistent with previous literature is that the nature of the exercise engaged in during the study was not effective in impacting body shape preoccupation. While meta-analyses have shown that exercise is associated with small improvements in body image (Hausenblas & Fallon, 2006), the effects have been mostly attributable to aerobic activity and moderate-to-strenuous exercise. The exercise employed in this study was anaerobic in nature and perhaps not strenuous enough to elicit change. In addition, Hausenblas and Fallon's (2006) meta-analysis indicated that the size of the positive effect of exercise on body image is significantly larger for men than women. Thus, the overrepresentation of women in the current study may have subdued the positive effects of exercise on body image.

Limitations and Future Directions

Several limitations should be highlighted. First, this quasi-experimental study did not randomly assign participants to conditions and this study did not include a comparison group of individuals engaging in group-based religious meditation without an exercise component. Although the analyses controlled for the total amount of time spent in exercise and religious meditation, being able to compare the religiously-focused exercise condition to a religious meditation condition would strengthen conclusions regarding the validity of integrating a religious focus into exercise as a means for minimizing body image concerns in comparison to

simply engaging in religious meditation as a means of decreasing body shape preoccupation.

Second, the current study examined a religiously-focused exercise regimen that was based in Christian Scriptures and the vast majority of participants (85%) identified as Christian. Therefore, the findings of this study should not be generalized to those of different faiths.

A third consideration for understanding and applying the current data is that the majority of the sample (82%) was female. Given this gender disparity, the number of participants across the three conditions was too small to conduct gender comparisons. It would be valuable for future research to evaluate how men and women respond differently to religiously-based exercise interventions.

Conclusions

Many religions have doctrines and practices that can influence body image (Spangler, 2010). The current study highlights that focusing on Christian Scriptures generally, not doctrines or practices related to the body specifically, but doing so in concert with body postures and movements, has the potential to minimize preoccupation with one's body shape. This may serve as a method to help individuals implicitly learn religious truths about themselves during a physical exercise regimen. Several possible mechanisms may contribute to this, including motor encoding of religious principles or cognitive cueing of religious principles through body postures and movements in daily life.

These principles are relevant to disciplines such as cognitive neuroscience and cognitive science of religion and can be applied within clinical psychology. Further research is needed to examine whether these results can be replicated in an experiment with random assignment and whether group differences are maintained across time. If confirmed through further research, infusing a religious focus into exercise may inspire practical, inexpensive methods of preventing

or treating body shape dissatisfaction among young adults.

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Table 1

Demographic, personal, and psychological variables

	Full Sample N = 113	Group 1: Religiously-focused Exercise n = 39	Group 2: Standard Exercise n = 30	Group 3: Control n = 44	Test Statistic for Differences in Change Between Groups (η_p^2)
Demographic/personal variables at T1					
Age, *M* (*SD*)	19.76 (1.57)	20.28[e] (1.32)	20.07[e] (1.68)	19.09[f] (1.48)	7.55** (.12)
Gender, % female	82.30	82.05	76.67	86.36	.10
Race, % Caucasian	59.29	69.23	50.00	56.82	.27
Household income[a], *M* (*SD*)	3.43 (1.55)	3.55 (1.57)	3.27 (1.57)	3.43 (1.55)	.28
Religiousness[b], *M* (*SD*)	3.37 (1.32)	3.46 (1.33)	3.23 (1.30)	3.39 (1.33)	.26
Spirituality[b], *M* (*SD*)	3.94 (1.10)	4.13 (1.13)	3.83 (.99)	3.84 (1.16)	.88
Belief in God[c]	2.84 (.41)	2.87 (.34)	2.70 (.60)	2.9 (.29)	2.52
Religious service attendance[d]	4.89 (1.37)	5.13 (1.03)	4.77 (1.38)	4.77 (1.60)	.88
Frequency of prayer[e]	6.04 (2.81)	6.08 (2.91)	5.83 (3.09)	6.16 (2.56)	.12
Amount of meditation[f], *M* (*SD*)	30.42 (55.15)	37.72 (73.79)	33.00 (51.15)	22.20 (34.98)	.86
Amount of exercise[f], *M* (*SD*)	259.59 (343.60)	283.65 (353.59)	281.30 (423.63)	224.57 (272.43)	.38
Medical services, %	23.21	33.33	13.33	20.93	.19
Psychological services, %	7.08	12.82	6.67	2.27	.18
Psychological variables at T1, *M* (*SD*)					
Body shape preoccupation		21.49 (11.68)	19.23 (8.64)	23.41 (10.72)	1.40
Psychological symptoms		17.46 (10.70)	19.67 (10.79)	22.70 (9.64)	2.17
Negative affect		17.35 (4.73)	18.13 (5.41)	19.25 (6.30)	1.21
Positive affect		33.62 (8.52)	29.23 (8.67)	33.34 (8.56)	2.70
Model 1[g] Change in psychological variables from T1 to T2, *M* (*SE*)					
Body shape preoccupation		-2.52*[j] (.86)	-.03[jk] (1.00)	2.33*[k] (.82)	8.17** (.13)
Psychological symptoms		-.031 (1.00)	.18 (1.86)	2.27* (1.52)	.37
Negative affect		-1.97** (.82)	-1.60 (.95)	.04 (.78)	1.71
Positive affect		-1.90 (1.18)	-1.04 (1.38)	-2.43 (1.12)	.29
Model 2[h] Change in psychological variables from T1 to T2, *M* (*SE*)					
Body shape preoccupation		-2.30*[j] (.93)	.01[jk] (1.03)	2.36*[k] (.87)	6.06** (.11)
Psychological symptoms		-.76 (1.55)	.10 (1.71)	3.00* (1.45)	1.56
Negative affect		-2.17** (.86)	-1.75 (.95)	.02 (.80)	1.77
Positive affect		2.29 (1.23)	.51 (1.35)	2.27 (1.14)	.61
Model 3[i] Change in psychological variables from T1 to T2, *M* (*SE*)					
Body shape preoccupation		-2.54*[j] (.92)	-.13[jk] (1.00)	2.67*[k] (.86)	7.73** (.14)
Psychological symptoms		-1.72 (1.32)	-.44 (1.45)	4.19* (1.24)	5.26** (.10)
Positive affect		-2.12 (1.23)	-.41 (1.35)	-2.48 (1.15)	.72

Note. Multiple comparisons made use of Bonferroni adjustment.
[a] Ranging from 1 = "under $30k" to 5 = "over $120k." [b] Ranging from 1 = "not at all" to 5 = "very". [c] Ranging from 1 = "I don't believe God exists," 2 = "I don't know whether there is a God," to 3 = I believe God exists." [d] Ranging from 1 = "never" to 6 = "once a week." [e] Ranging from 1 = "never" to 9 = "more than once a day." [f] Average number of minutes per week. [g] Controlled for: baseline levels of body shape preoccupation, psychological symptoms, and positive and negative affect. [h] Controlled for: age, income, religiosity, spirituality, amount of time spent in religious meditation and exercise over the course of the intervention period, and all model 1 controls. [i] Controlled for T2 negative affect and all model 2 controls. [jk] Groups that do not share superscripts differed at the $p < .01$ level.
* $p < .05$ ** $p < .01$

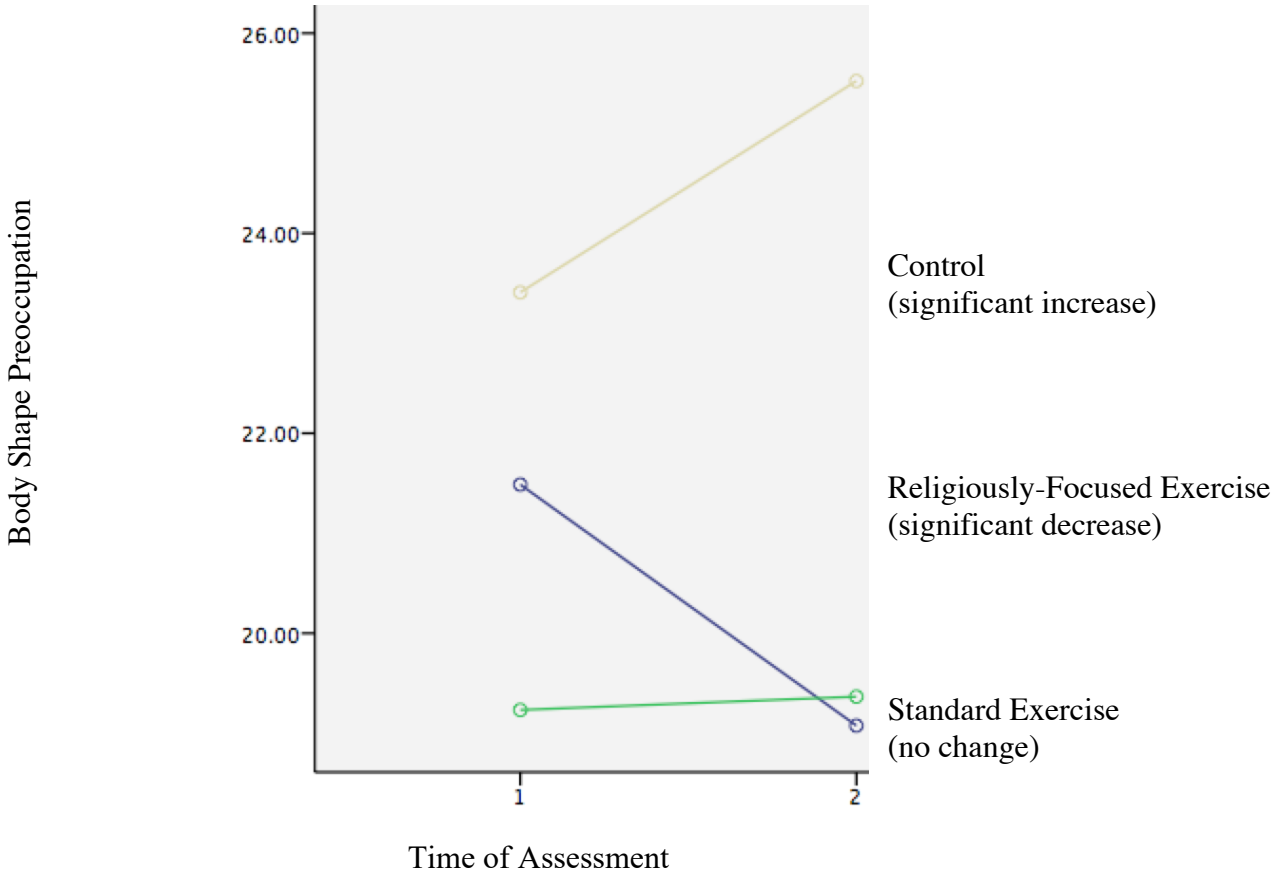

Figure 1. Comparison of three groups on change in body shape preoccupation from Time 1 (T1) to Time 2 (T2) without inclusion of control variables. The groups did not differ significantly from one another in T1 body shape preoccupation. The Religiously-Focused Exercise Group differed significantly from the Control Group in change in body shape preoccupation from T1 to T2.

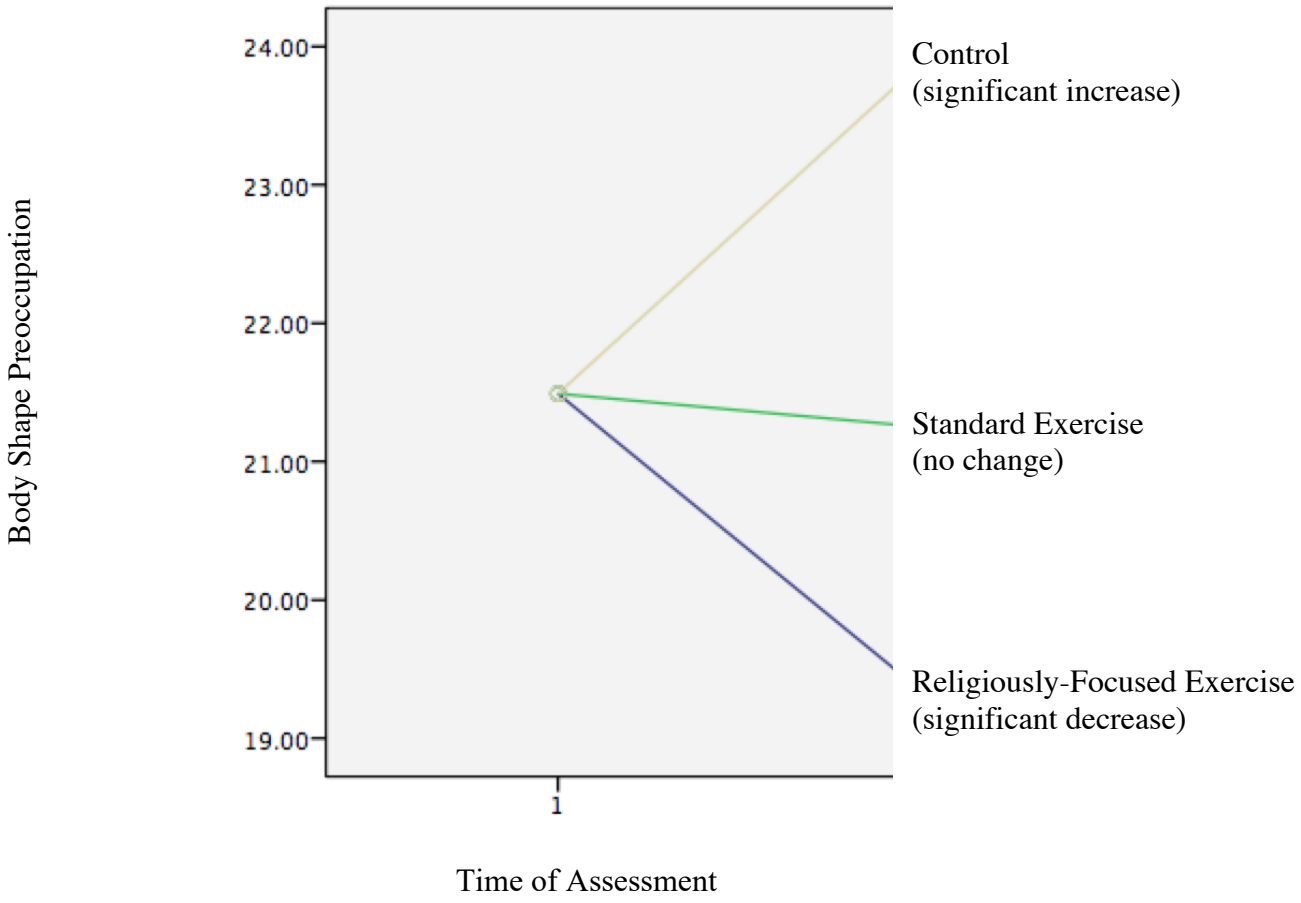

Figure 2. Comparison of three groups on change in body shape preoccupation from Time 1 (T1) to Time 2 (T2), controlling age, income, religiosity, spirituality, amount of time meditating and exercising, and T1 body shape preoccupation. The Religiously-Focused Exercise Group differed significantly from the Control Group.