The Effect of Guided Relaxation and Exercise Imagery on Self-Reported Leisure-Time Exercise Behaviors in Older Adults

Bang Hyun Kim, Roberta A. Newton, Michael L. Sachs, Peter R. Giacobbi, Jr., and Joseph J. Glutting

The purpose of this study was to examine the effects of a 6-wk intervention that used guided relaxation and exercise imagery (GREI) to increase self-reported leisure-time exercise behavior among older adults. A total of 93 community-dwelling healthy older adults (age 70.38 ± 8.15 yr, 66 female) were randomly placed in either a placebo control group or an intervention group. The intervention group received instructions to listen to an audio compact disk (CD) containing a GREI program, and the placebo control group received an audio CD that contained 2 relaxation tracks and instructions to listen to music of their choice for 6 wk. Results revealed that listening to a GREI CD for 6 wk significantly increased self-reported leisure-time exercise behaviors ($p = .03$). Further exploration of GREI and its effects on other psychological variables related to perceived exercise behaviors may substantiate its effectiveness.

Keywords: motivation, aging physical activity

Previous research has shown that older adults can physically and mentally benefit from participating in regular physical activity (Chodzko-Zajko et al., 2009; King, 2001; King, Rejeski, & Buchner, 1998; Taylor et al., 2006). Despite the numerous benefits of physical activity, more than 36% of adults age 65 and over do not get enough physical activity, and more than 32% of these adults do not engage in any leisure-time physical activity (Centers for Disease Control [CDC], 2007). Research also suggests that at least 30% of adults are inactive, and approximately 50% of those who start an exercise program (e.g., joining a gym/exercise club, workout routines, weight-loss diet plans) will drop out within a year (Dishman, 2001). Research efforts are therefore needed to create effective interventions that will not only motivate older adults to start an exercise program but also help them maintain an active healthy lifestyle (Cumming, 2008; Cumming & Stanley, 2009). However, finding inexpensive and effective ways to promote physical activity behaviors is an enormous challenge.
A possible tool to promote physical activity among older adults is exercise imagery. Exercise imagery is defined as a quasi-sensory experience that mimics a real event, activity, or exercise (Hall, 1995). It echoes or reconstructs an actual exercise experience such as one’s past, present, or future experience. Hall first stated that exercise imagery might play a role in motivation for exercise behavior. By imagining themselves participating in an activity that they enjoy and achieving goals such as better physical appearance and improved technique, exercisers may be more motivated to maintain an exercise program. Milne, Burke, Hall, Nederhof, and Gammage (2006) compared exercise-imagery use in younger and older adult exercisers. They found that younger and older exercisers had the same pattern of imagery use, with appearance imagery being used most often, followed by technique and energy imagery. However, the younger group used more appearance imagery than older exercisers, and younger women exercisers used less technique imagery than older women exercisers. A possible reason that younger adults tend to use appearance imagery more is that appearance seems to be an important motivator for younger adults, whereas older people tend to be more satisfied with their appearance (Hetherington & Burnett, 1994; Pliner, Chaiken, & Flett, 1990).

Giacobbi (2007) compared imagery use in exercise by age, gender, and activity level, including 401 participants age 18–65 who completed demographic assessments, the Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985), and the Exercise Imagery Inventory (EII; Giacobbi, Hausenblas, & Penfield, 2005). Findings revealed that more active people used appearance and health images more than less active people. In addition, younger participants reported using more technique imagery than older participants.

Many other studies have suggested that imagery might be a useful tool to increase exercise behavior (e.g., Cumming, 2008; Gammage, Hall, & Rodgers, 2000; Giacobbi, 2007; Giacobbi, Hausenblas, Fallon, 2003; Hall, 1995; Hausenblas, Hall, Rodgers, & Munroe, 1999; Kim & Giacobbi, 2009; Kossert & Munroe-Chandler, 2007; Rodgers, Hall, Blanchard, & Munroe, 2001; Wilson, Rodgers, Hall, & Gammage, 2003); however, no studies to date have tested this notion. Rather, all the previous exercise-imagery studies have been exploratory, to determine how exercisers use imagery. Therefore, intervention studies are needed to determine whether exercise imagery might be an effective tool to encourage individuals to begin a program of regular physical activity and establish a healthier, active lifestyle (Cumming & Stanley, 2009).

According to Wolsko, Eisenberg, Davis, and Phillips (2004), guided relaxation and imagery (GRI) is the third most commonly used mind-body therapy in the United States. This therapeutic tool is designed to ease anxiety levels and promote relaxation. Naparstek (1994), a pioneer in guided imagery, described GRI as a process of using imagination to help the mind and body heal, stay well, or perform well. Guided imagery involves the use of verbal instructions to create a flow of thoughts that focus the individual’s attention on imagined visual, auditory, tactile, or olfactory sensations. Relaxation is an essential addition to GRI because it allows more total concentration on body sensors (Baird & Sands, 2006).

In general, GRI has been proven an effective tool for a variety of conditions. Some successful GRI interventions include helping with smoking cessation (Wynd, 2005); improving quality of life in cancer patients (Luebbert, Dahme, & Hasenbring,
2001); and reducing stress and anxiety in patients undergoing chemotherapy (Walker et al., 1999), with fear of dental treatment (Willumsen, Vassend, & Hoffart, 2001), with fear of flying (Wiederhold et al., 2002), and with fear of snakes (Hunt et al., 2006). Although there have been many studies of GRI, its use in the older population is sparse (Morone & Greco, 2007). A current search of the literature found no research publications addressing the use of GRI to increase physical activity levels among older adults. With the numerous benefits of GRI and the results from previous research, it is worth examining whether GRI might help older adults increase their physical activity levels.

This study was the first to examine the effects of a 6-week intervention that used guided-relaxation and exercise-imagery (GREI) techniques on self-reported leisure-time physical activity behaviors among community-dwelling adults age 60 years and over. A secondary purpose was to study the effects of GREI techniques on exercise-imagery use.

Method

Study Design and Participants

This study was a randomized controlled trial with repeated measures. Participants were recruited from various churches, senior homes, and senior centers in a large urban city. A total of 93 (age 70.38 ± 8.15 years, 66 female) older adults completed the 6-week study. By ethnicity, 37 participants reported themselves as African American, 36 as Asian, 14 as White, 4 as Latino, and 2 as other. The inclusion health criteria were (a) ability to walk without aids (occasional cane users were included), (b) no history of any disabilities or illnesses that would limit one from listening to the GREI CD and filling out the measures, and (c) ability to understand the information in the informed-consent form and being willing and able to sign the consent. The consent form and proposal were approved by the university’s institutional review board.

Measures

LTEQ. The LTEQ is a 3-item scale that asks respondents to report how often they engage in mild (i.e., minimal effort), moderate (i.e., not exhausting, light sweating), and strenuous (i.e., heart beats rapidly) leisure-time exercise for at least 20 min during a typical week (Godin & Shephard, 1985). It allows calculation of a total metabolic equivalent (MET) score by weighting the intensity level as follows: MET = +3 (mild), +5 (moderate), and +9 (strenuous). The LTEQ is a reliable (r = .86) and valid self-report measure of exercise behavior in adults (Godin, Jobin, & Bouillon, 1986; Jacobs, Ainsworth, Hartman, & Leon, 1993).

EII. The EII is a 19-item scale developed through a construct-validation approach by Giacobbi et al. (2005). The scale consists of four subscales: exercise technique, exercise self-efficacy, exercise feelings, and appearance/health images. The items are anchored on a 7-point Likert scale with 1 indicating rarely and 7 indicating often. Evidence for the validity of the EII has been demonstrated through exploratory and confirmatory factor analysis with separate samples of college students and
adults throughout the age span (Giacobbi et al., 2005). In addition, correlations reported by Giacobbi et al. (2005) between EII subscale scores, exercise behavior, and exercise self-efficacy yielded positive and significant associations that ranged from .10 to .46 and demonstrated construct validity.

**Procedure**

Participants met with the first author twice to conduct pretests and posttests at senior centers, churches, or their homes. During the pretest, the participants provided informed consent and completed a demographics form. They then completed the two questionnaires (LTEQ and EII) and were randomly assigned to the intervention group (IG) or placebo control group (PCG) by the first author (by flip of a coin). Once a group filled to a maximum number of 45, the first author placed the rest of the participants in the other group. The extra 3 participants were all placed in the IG by random assignment (i.e., flip of coin). There was no concealment of allocation for the first author once all the participants were randomly assigned to the IG or PCG. This was a single-blinded randomization procedure wherein the first author knew where participants were placed but the participants had no knowledge of whether they were placed in the IG or PCG.

The groups received either a GREI audio CD created by the researcher or a placebo audio CD that included two relaxation tracks. The IG received the GREI audio CD. The GREI audio CD consisted of one introduction track, two guided-relaxation tracks, and 11 guided-imagery tracks. The introduction track explained how to use the CD. Track 2 consisted of an imagery-controllability and -vividness exercise to familiarize the participant with imagery. Tracks 3 and 4 consisted of two relaxation tracks: progressive muscle relaxation (Jacobson, 1974) and deep breathing. Progressive muscle relaxation (Jacobson, 1974) is a procedure that teaches individuals to relax their whole body through a two-step process. Specifically, one must deliberately apply tension to certain muscle groups, then stop the tension and turn one’s attention to notice how the muscles relax as the tension flows away. Deep breathing is breathing deeply into the lungs by flexing the diaphragm rather than breathing shallowly by flexing the rib cage.

The tracks on the CD are as follows:

1. Introduction to the GREI CD
2. Imagery exercise (how to control your images and make them vivid)
3. Guided relaxation 1—Progressive muscle relaxation
4. Guided relaxation 2—Deep breathing
5. Guided imagery 1—In home (morning)
6. Guided imagery 2—In home (evening)
7. Guided imagery 3—In home (preparing a meal)
8. Guided imagery 4—Cleaning the house
9. Guided imagery 5—Walking to neighbor’s house
10. Guided imagery 6—Walking around the neighborhood
11. Guided imagery 7—Walking around a park
12. Guided imagery 8—Walking around the grocery store
13. Guided imagery 9—Walking on a rainy day
14. Guided imagery 10—Walking on an icy day
15. Guided imagery 11—Walking on a beach

As the tracks progress, the activities become more difficult. The program starts with simpler tasks (e.g., waking up in the morning and going to the bathroom) to first familiarize participants with imagery, and, as they progressed through the tracks, they could become more confident performing the more difficult tasks (e.g., walking on an icy road).

The PCG received an audio CD that consisted of one introductory track and two guided-relaxation tracks. They were also asked to listen to music of their choice for 5 min after listening to a relaxation track.

All groups were asked to listen to either the GREI audio CD or the relaxation track and songs of their choice for 6 weeks, two times a week for 10 min a session. The time of day and day of the week were their choice; however, the schedule had to be consistent throughout the 6 weeks. Participants were given an instruction booklet that provided a schedule of tracks to listen to on a certain day and a checklist to monitor their progress during the 6 weeks. The researcher also emphasized to only listen to the given set of tracks on that given day as indicated in the instruction booklet. This was an important element of the study, and the first author asked participants to sign a trust agreement letter stating that they would only listen to the given track on a given day listed in the instruction booklet. After 6 weeks, participants were retested using the same questionnaires they were given at the pretest.

Data Analysis

A priori power was estimated for each outcome measure (i.e., LTEQ and EII) and estimated for dropouts over a 6-week period in the study to determine the number of participants for the study. A two-tailed alpha level was set to .05. Overall power was set to .80, meaning the study had an 80% probability of finding a significant difference if such differences existed in the population. Equal sample sizes were assumed, and overall a sample size of at least 90 participants was decided on by a statistical power analysis using a multivariate method (Tabachnick & Fidell, 2006) with a medium effect size of \( f = .25 \) (at least 45 per group).

A separate repeated-measures ANOVA was completed for each dependent variable (i.e., EII and LTEQ). There were two groups in the analyses: the IG and the PCG. This analysis is straightforward, and results are interpreted according to traditional ANOVA conventions (i.e., a time effect, a group effect, and a group-by-time interaction), which makes it understandable to a wider audience (Maxwell & Delaney 2004; Wickens & Keppel, 2004). All data analyses were performed using SPSS software (Chicago, IL), version 17 (2008).

Results

Originally, 184 participants were recruited for this study. After withdrawals, health-criteria exclusions, health issues (e.g., death, hospitalization), and personal issues, 93 of the 184 (50.5%) originally recruited participants completed this 6-week
intervention study. Most participants reported their health to be fair (78.7%), and only a few of the participants self-reported health-related problems such as cane and walker use (4.3%), balance problems (10.9%), and high blood pressure (7.1%). More than 14% self-reported lower activity levels (e.g., restricted activities), and 22.8% felt that they should be more physically active than they were.

The IG had 48 participants (age 70.56 ± 8.73 years) including 22 men and 26 women. By race, 21 reported themselves as African American, 14 as Asian, 8 as White, 4 as Latino, and 1 as other. The PCG had 45 participants (age 70.93 ± 8.94 years), 17 men and 28 women. By race, 15 reported themselves as African American, 23 as Asian, 6 as White, and 1 as other.

A Pearson chi-square analysis was conducted to test for significant differences in age, race, and gender between the groups. There were no significant differences between the groups in age, \( \chi^2(23) = 20.94, p = .585 \); race, \( \chi^2(4) = 7.39, p = .117 \); or gender, \( \chi^2(1) = .619, p = .431 \). Preliminary comparisons also revealed that the two groups were essentially equivalent on the LTEQ pretest measure, \( t = 1.584, df = 91, p = .117 \), and the EII pretest measure, \( t = .974, df = 91, p = .332 \).

**LTEQ**

Results from the study revealed that the IG had an increase in total MET scores (pretest 24.72 ± 8.63, posttest 30.04 ± 11.37) after 6 weeks. The PCG decreased in total MET scores (pretest 21.69 ± 9.87, posttest 20.96 ± 9.36) after 6 weeks. From the repeated-measures ANOVA analysis, the main effect for time was not statistically significant, \( F = 2.78, df(1, 91), p = .099 \), but the main effect for group, \( F = 15.96, df(1, 91), p = .001 \), and the group-by-time interaction, \( F = 4.84, df(1, 91), p = .03 \), were significant.

Effect sizes were interpreted according to Murphy and Myors’s (2004) guidelines for partial eta-square (\( \eta^2 \)), wherein \( \eta^2 \) of .01 represents small effect sizes; \( \eta^2 \) of .06, medium effects; and \( \eta^2 \) > .14, large effects. The obtained effect for group represented a large effect size (\( \eta^2 = .15 \)). The group-by-time interaction revealed a small to medium effect size (\( \eta^2 = .05 \)).

**EII**

Results from the study revealed that the IG had a significant increase in total EII scores (pretest 68.00 ± 13.18, posttest 83.19 ± 15.66) after 6 weeks. The PCG did not have a significant difference in total scores (pretest 70.93 ± 15.81, posttest 73.47 ± 9.15). Results revealed that the main effect for time, \( F = 21.49, df(1, 91), p = .001 \), and group-by-time interaction were significant, \( F = 10.96, df(1, 91), p = .001 \), but the main effect for group was not significant, \( F = 2.57, df(1, 91), p = .112 \). The obtained effect for time represented a large effect size (\( \eta^2 = .19 \)). Likewise, the group-by-time interaction revealed a medium to large effect size (\( \eta^2 = .11 \)).

**Discussion**

Listening to the GREI CD for 10 min, two times a week, for 6 weeks resulted in a significant increase in self-reported leisure-time exercise behaviors and exercise-imagery use among community-dwelling older adults. The PCG (instructions to
listen to the guided-relaxation CD along with music of choice for 10 min, two times a week, for 6 weeks) did not significantly improve self-reported leisure-time exercise behaviors and exercise-imagery rates. These findings are important because mental imagery can potentially offer a cost-effective way to increase leisure-time physical activity among older adults.

In regard to national exercise-level standards, the CDC (2009) recommends that older adults age 65 and over exercise at least 150 min at moderate intensity or 75 min at vigorous intensity each week for health benefits. If the CDC recommendations were incorporated into the LTEQ scoring system, older adults would have to score at least 45 METs (e.g., 5 days × 9 METs, meaning vigorous activity) to maintain health benefits. In the current study, both groups scored below 45 METs. This may indicate that all the participants in this study were not exercising the amount needed to get health benefits as indicated by the CDC. Although the IG had lower MET scores than the levels recommended by the CDC (2009), the GREI CD showed an effect in increasing the MET score for those in this condition. This is important because the main goal of this study was to determine whether the GREI CD had motivating effects for older adults to increase their physical activity behaviors. Results from this study revealed that the GREI CD had a significant impact on reported exercise levels. This might be an important notion for future studies that focus on designing exercise programs or interventions for sedentary older adults.

Two other studies that used the LTEQ with an older population were compared with this study. Wójcicki, White, and McAuley (2009) used the LTEQ with 320 healthy adults age 50 and over (mean age 63.8). Their results revealed an average MET score of 42.52. Giacobbi (2007) assessed the LTEQ with 167 participants age 45–65 (mean age 48.75), and their average score was 35.99. These studies show that even healthy adults age 45 years and over had average scores below the CDC guideline. The results from the two studies might suggest that either middle-aged and older adults are not getting enough exercise or the CDC standards are too high. Although it is difficult to make general assumptions from these studies, more research is needed in this area to create a more suitable physical activity guideline for older adults or create interventions that would promote a more active lifestyle for sedentary older adults.

In regard to exercise imagery, to our knowledge this study was the first to use mental imagery as part of an intervention protocol with adults age 60 years and over. This advance in our understanding of the effect of mental imagery on behavior is important because most studies in this area have been descriptive or observational in nature (Kim & Giacobbi, 2009). Further efforts to examine the impact of mental imagery on older adults’ physical activity behaviors appear warranted. Such efforts might include breaking down the EII scores into subscales (e.g., technique, appearance, health imagery) and examining what kinds of imagery participants used the most and what kind of exercise imagery improved the most by using the GREI CD. It would also be interesting to compare the scores of the subscales by gender, age, ethnicity, and exercise level to determine whether exercise imagery actually has an effect in any of these categories.

Despite this being an innovative study, a number of limitations are observed. First, because of the small sample and dropouts after recruitment, the results may not be generalizable to a larger population. Another limitation was that some participants reported not enjoying listening to the GREI CD simply because it did not relate to
their lives. The GREI CD was created through general concepts and ideas in the research of healthy aging and exercise imagery. A suggestion for future researchers interested in using guided exercise imagery is to make a guided-imagery script as unique and personal as possible to each participant to enhance his or her imagery experience. Another limitation was the use of self-reported physical activity measures. Researchers might want to study the effects of GREI by using different physical activity measures (e.g., heart-rate monitoring, room calorimetry, and step count using accelerometers) for more objectively measured levels of physical activity behavior.

Additional research is needed to find different ways to offer GREI techniques to older adults, such as the Internet, newspapers, mp3 files, or magazines. In addition, health care providers and researchers should find more ways to stimulate images to encourage a person’s mind to healthier outcomes associated with imagery. Qualified practitioners could also help older adults write imagery scripts that focus on their target behaviors such as increasing their exercise levels. For those who favor a less structured approach, practitioners might be able to develop a list of cue words or triggers that stimulate specific images and apply such triggers during specific times throughout the day (Giacobbi, 2007).

Future research should also examine innovative ways to create a monitoring system throughout an intervention phase, especially for physical-activity-related interventions. We monitored the intervention by asking the participants to sign an agreement letter and giving them a checklist booklet (e.g., checking if they listened to a certain track on a certain day) that they returned at the end of the intervention study. All the participants who completed the intervention completed this checklist booklet. Future studies might want to consider using more modern-day technologies such as text messaging or online monitoring to get real-time monitoring rather than waiting to see if participants had completed the study after the intervention period.

In conclusion, regular physical activity should be assessed by health care providers and practitioners as they work with older adults. As shown in this study, the GREI CD helped increase reported exercise levels and exercise-imagery rates among individuals. A future suggestion for practitioners and health care providers is to use the GREI CD as an educational tool, a starting block for individuals who want to start an exercise program but do not know where to begin. Hopefully, once older adults learn how to use imagery, they will be able to use it on their own whenever they need the motivation or confidence to start exercising and increase their exercise levels.

Acknowledgment

We would like to especially thank Dr. Karen Glanz for her feedback and suggestions on this article. We would also like to thank Drs. Stephen Lepore and Joseph DuCette for their expertise advice. Lastly, special thanks to the editors and the two reviewers for their thoughtful feedback. Please direct correspondence to Bang Hyun Kim at bangk@upenn.edu

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