

The Psychology of Exercise

by [Jim Gavin, PhD](#), [Daniel Sequin](#) and [Madeleine McBrearty, PhD \(candidate\)](#) on Feb 01, 2006.

A review of the latest research provides clues about what motivates people to exercise and what keeps them coming back.

As a fitness professional, you have firsthand knowledge of how clients think, feel and act in relation to exercise. But how does your understanding compare with findings from recent exercise psychology research? Take this pop quiz.

1. Do older adults place more emphasis than younger exercisers on the health benefits of exercise?
2. Are women who take aerobic dance classes more satisfied with their bodies than women who take hatha yoga?
3. Is aerobic exercise better than nonaerobic activity for boosting moods?
4. Do runners find longer-duration runs more effortful than shorter ones?
5. Does mental distraction make exercising easier?

To find out how your answers compare with the statistics, take this journey with us through a review of exercise psychology research. In this review, we investigate some of the more interesting trends and findings from 2002, when the last review was conducted (Gavin & Spitzer 2002), until 2005. We focus specifically on exercise psychology, which studies the general population, rather than sport psychology, which spotlights athletes. The review is organized around three themes:

- motivation and participation
- exercise structures
- exercise benefits

Motivation and Participation

What have we learned in recent years about why people initiate exercise and, hence, what we can do to encourage them to start—and stick with it? The studies we reviewed investigated the influence of age and sex, as well as exercise structure.

Age Differences. Many people believe that older adults exercise predominantly for health reasons. But in a study of 692 adults who for the most part (87%) exercised regularly, "positive health" was the most important motive for exercise across *all* age groups; moreover, it was equally important for men and women, and for all levels of socioeconomic status (Rochholz 2004). A related study supported the universal appeal of health as a motivator, and found the distinguishing factor between older and younger exercisers to be the declining importance of physical appearance as a motivator with increasing age (Trujillo, Brougham & Walsh 2004).

In a study of 2,390 Belgians, additional age-related exercise motives were identified (De Bourdeaudhuij & Sallis 2002). For young women 16–25 years old, health was the most significant reason for exercise; but for young men of the same age, it was competition. Two other findings emerged in this study: (1) Social support for physical activity from friends and family was seen as critically important, irrespective of age or sex; and (2) surprisingly, among these subjects, enjoyment did not figure as a relevant motivator for any age group or sex. This last finding deserves our attention. Is exercise perceived as a necessary evil, and how much might this contribute to low participation rates?

In searching for the roots of exercise motivation, some researchers focused on adolescents. Not unexpectedly, weight issues figured prominently, but sex differences consistently emerged. Boys (16–18 years) were motivated as much by weight gain as weight loss, while most girls of the same age wanted to be lighter (Furnham, Badmin & Sneade 2002). In this same study, it was noted that self-esteem tended to be lower in girls who expressed dissatisfaction with their bodies, while in boys body dissatisfaction was unrelated to self-esteem. This finding suggests that societal forces continue to equate worthiness with physical appeal for women but not for men.

A parallel study of adolescents argued convincingly that their focus on weight management through physical activity was double-edged (Ingledeu & Sullivan 2002): While this motivational base might motivate inactive teens to initiate exercise, it was thought to undermine *intrinsic* motivation, which serves to sustain involvement.

Sex Differences. Evidence on whether men or women participate more in leisure-time physical activity is equivocal (Brownson & Boehmer 2005), with some indicators suggesting that women are more physically active throughout the lifespan (U.S. Department of Health and Human Services 2002). Researchers have shown a keen interest in sex differences in exercise behaviors, with special

attention focused on the related concerns of body image and eating disorders. Our review does not attempt to summarize knowledge about differences, but simply highlights new studies.

In one study women who participated in hatha yoga classes demonstrated a higher level of body satisfaction than women in aerobics classes—and also showed less tendency to objectify their bodies or internalize society’s “thinness ideal” (Daubenmier 2003). Paralleling these findings, another study concluded that women who exercised for reasons of weight, tone and attractiveness experienced lower self-esteem and body satisfaction than women who exercised for improved mood, health and enjoyment (Strelan, Mehaffey & Tiggemann 2003).

The problem of excessive exercise among women was explored with self-assessments. Women who reported that they exercised excessively had greater difficulty communicating feelings to others, experienced more extreme feeling states and had a higher incidence of bodily complaints. Though some women in this group were also found to have eating disorders, these two conditions did not always co-exist (Hentel 2003).

Exercise is normally associated with positive mental health; yet in a study of undergraduates, this relationship consistently held up only for men. For exercising women who did not have symptoms of disordered eating, the positive exercise–mental health relationship was evident. However, exercising women who had disordered eating patterns reported a greater incidence of negative feelings, depression and anxiety than women without these issues (Thome & Esplelage 2004). One implication of this study is that as much as exercise can improve moods and relative anxiety, it cannot counter the negative impact of other lifestyle behaviors.

A surprising finding emerged in a study of middle-aged women. We might anticipate that women who exercised regularly would show more concern about body image, weight and physical attractiveness than those who didn’t, but the opposite was true (Whaley 2003). Nonexercising women expressed greater hopes and fears related to body image than exercising women, even though the nonexercisers ostensibly weren’t engaged in positive physical action to support their hopes or counter their fears.

At the end of a workout, who do you think experiences greater reductions in mental and physical exhaustion—men or women? According to a study of 135 men and women participating in cardiovascular or weight training, although all exercisers showed mood benefits, women experienced significantly greater

pre/postexercise reductions in reported levels of exhaustion (Rocheleau et al. 2004).

One study assessed the value of women-only fitness clubs and found not only that “social physique anxiety” was higher in women who exercised in a mixed-sex facility but also that more women than men were likely to shorten their workouts in this environment (Kruisselbrink et al. 2004).

Exercise Structures

Exercise psychologists continue to explore guidelines for duration, frequency and intensity. A fourth variable—modality, or the nature of the activity itself—is yet another major focus. Finally, many researchers have investigated the role of distraction in the exercise environment.

Duration. In our last review, we noted a study showing that exercisers could obtain mood benefits from as little as 10 minutes of aerobic activity (Hansen, Stevens & Coast 2001). What new findings have emerged in the past few years? The benefits of short bouts of exercise were re-examined in an 8-week study of sedentary adults that contrasted the mood benefits of three 10-minute exercise periods with those of a continuous 30-minute program. Both programs led to improvements in VO_2 max and mood, but the continuous training resulted in greater reductions in percent body fat, anxiety and total mood disturbance, while increasing reported levels of happiness and vigor (Osei-Tutu & Campagna 2005). Though 10-minute bouts yielded both physical and psychological benefits, the authors argued that continuous 30-minute periods had greater psychotherapeutic effects.

When do mood changes become most evident? One study of experienced runners in a 60-minute treadmill run showed that improvements in composure, energy, elation and mental clarity became most evident after 40 minutes (O’Halloran, Murphy & Webster 2004). (This study focused on mood changes *within*, rather than after, the exercise experience.)

If you run 8 miles one day and 10 miles another day, which run will seem more effortful? If you don’t run often, will a 20-minute treadmill run seem more effortful than a 10-minute one? Counterintuitively, in a study by Baden and colleagues, the longer runs were experienced as less effortful. The authors suggested that the runners tended to tune out more in the longer runs, reducing their sense of fatigue and effort (Baden, Warwick-Evans & Lakomy 2004).

Duration and Intensity. What happens when duration is mixed with intensity? In a 3-day-a-week, 12-week exercise program, 56 relatively inactive adults were assigned to either a higher-intensity, shorter-duration workout (70% of VO_2 max for 15–24 minutes) or a lower-intensity, longer-duration workout (50% of VO_2 max for 28–36 minutes), with both conditions equated for total work output. Although fitness gains were comparable between conditions, participants in the lower-intensity, longer-duration group expressed significantly less confidence in their ability to continue exercising. The authors reasoned that programs that are not perceived as challenging may reduce exercise motivation, even though the individuals in the longer, slower condition were as “successful” as those in the more intensive training regimen (Rodgers et al. 2002a).

Frequency and Intensity. If you were designing a walking program for sedentary men with the goal of improving adherence, would you prescribe three to four walks a week or five to seven? Would you design a high-intensity or moderate-intensity workout? If you answered three to four walks a week at moderate intensity, you would be right about intensity, but not frequency. Surprisingly, according to a study by Rodgers and colleagues (2002), the more frequent the prescribed exercise, the better the adherence. Not so surprising was the finding that high-intensity training was associated with more frequent injuries (Perri et al. 2002).

Two other studies generally support what might be considered rules of thumb regarding intensity. In the first, when exercise intensity required a transition to anaerobic metabolism, negative affect or feeling was generated (Hall, Ekkekakis & Petruzzello 2002). Even though feeling states tended to rebound after the exercise experience, the authors argued that such transient negative affect could reduce adherence, especially for inexperienced exercisers. The second study, which measured affect before and periodically after exercise (up to 60 minutes after), supported a curvilinear dose-response relationship between intensity and affective response: Moderate training intensities resulted in immediate, large and enduring affective benefits (Arent et al. 2005).

Modality. Common wisdom suggests that people are happiest when they are doing what they like, and research supports this bromide. In one study, participants did both an exercise of choice and no-choice stationary cycling. Not only did the cycling experience produce negative affect, but contrary to much of the evidence in exercise psychology, a control group experience of simply watching TV produced more positive affect than the cycling (Daley & Maynard 2003).

A perplexing result was observed in a comparison of four exercise modalities: aerobic dance, Feldenkrais®, yoga and swimming. Participants were 147 adult female teachers who took one session of each activity and then completed questionnaires. Contrary to typical findings, the aerobic dance experience produced no mood benefits, whereas the other activities generated more positive moods and enhanced feelings of well-being. The authors did not argue against potential mood benefits from aerobic dance; rather, they emphasized that low-intensity exercise can be as valuable in producing positive mood shifts (Netz & Lidor 2003).

Perhaps one activity is not necessarily better than another in terms of psychological benefits; the outcomes may simply differ. In a comparison of university hockey players and students who trained at health clubs, the hockey players reported more positive relations with others, greater sport competence and higher levels of sport importance; but club members expressed higher perceptions of body attractiveness and environmental mastery (Edwards, Edwards & Basson 2004).

Structured Distraction. Most fitness centers intuitively structure the environment so exercisers can distract themselves while training. Is this a good thing? A study of runners on indoor tracks showed that the use of dissociative-external thoughts (watching others or the environment) helped the runners feel less physically exhausted and more revitalized (Blanchard, Rodgers & Gauvin 2004). A more indirect test comes from a study of students in aerobic dance classes who described the music (even more than the instructor) as the element contributing most to their sense of enjoyment (Wininger & Pargman 2003).

What effect do virtual-reality games and simulations have on the exercise experience? In one study in which these games were coupled with stationary cycling, they were found to increase energy, enhance enjoyment and reduce tiredness—even though without exercise they reduced energy and increased tension and tiredness (Plante et al. 2003b). A second study using walking as the exercise form supported these results (Plante et al. 2003a).

One final piece of evidence got right to the heart of the value of distraction. College students were instructed to exercise while reading, while watching TV or without any distraction. The results? No differences in mood benefits. The authors offered a convincing argument that it isn't distraction per se that is important, but whether the distraction is enjoyable and self-motivating. Watching the TV news may be enjoyable for some viewers, while watching sports may motivate others. This variety is often reflected in the multiple TV monitors in gyms.

These studies on distraction reflect at best the tip of the iceberg. Far more needs to be understood about what different people do with their minds while exercising.

Exercise Benefits

Research generally supports the mood-boosting, anxiety-reducing, stress-buffering and esteem-generating benefits of physical activity (Gavin 2005; Penedo & Dahn 2005). Are there other advantages you can cite to your clients?

Studies in our review demonstrated how exercise can be helpful to people contending with diverse physical and emotional conditions. For instance, research indicated that increasing physical activity can have profound psychological benefits for people with spinal-cord injuries (Latimer, Martin & Hicks 2005), posttraumatic stress disorder (Manger & Motta 2005), Alzheimer's disease (Heyn 2003), fibromyalgia (Oliver & Cronan 2005), HIV (Rojas, Schlicht & Hautzinger 2003) and breast cancer (Pinto et al. 2003), as well as general medical conditions (Hardcastle & Taylor 2005).

Are there still other benefits? Rather than naming them all, we will restrict our input to highlights that you may not know of or that can solidify your understanding.

In one study, people who exercised three to four times a week reported **higher job performance** than those who exercised one to two times a week, and both groups outperformed nonexercisers (Cone 2002). Moreover, exercisers had **lower absenteeism** and a **greater awareness of health issues** (Ur 2001).

Depressed individuals assigned to exercise programs that burned 17.5 kilocalories per kilogram per week showed significant **improvements in depression scores**, while those exercising at lower levels showed little improvement, similar to those noted in an inactive control group.

What will middle-aged people who have never exercised gain from initiating a workout program? Research on women aged 43–77 referred by their physicians for medical conditions indicates that the women developed a **meaningful, self-sustaining new exercise identity**. As one participant noted, "It's redefining yourself and working out who you are" (Hardcastle & Taylor 2005). A related study of women referred by their doctors showed that one of the biggest gains in becoming active was **self-acceptance** (Crone, Smith & Gough 2005).

A number of studies focused on the benefits of exercise for different age groups. Of particular concern were **cognitive, or mental-function, benefits for older exercisers and mood benefits for at-risk children**. The case for cognitive benefits for the elderly seems strong (Colcombe & Kramer 2003), though there is question about whether exercise improves all aspects of mental functioning. One study of older adults (average age = 71) noted that exercise helps mostly in the recall of verbal information (Woo & Sharps 2003).

Results of a 6-week program directed toward low-income, at-risk Hispanic children showed that the brief intervention had a significant impact in reducing depression and increasing self-esteem (Crews, Lochbaum & Landers 2004). And a study of German adolescents (14–18 years) found that active teens showed less anxiety, depression and social inhibition than their inactive peers (Kirkcaldy, Shephard & Siefen 2002).

Evidence suggests that people who exercise regularly are **better leaders**. In a study at the Center for Creative Leadership, senior executives who were more physically active scored higher on leadership measures than their peers who were inactive (McDowell-Larsen, Kearney & Campbell 2002).

How Did You Do?

Go back and take that pop quiz again. Do the research results confirm your own experiences with clients? Remember, each study is a unique bundle of techniques, tests and participants. Change any of these elements and the results may differ. This isn't an argument for discounting any of the findings, but rather one for interpreting them with caution.

The story this research summary tells is an optimistic one. Exercisers get many benefits from physical activity. The challenge is to inspire more people toward active living. We need to help people, not only with their biomechanics, but also with their psychology of movement. Through conversations and coaching, we can inspire people to find joy in their activities, purpose in what they do, relationships in their exercise world and, above all, the means to realize their dreams.

The Role of Other Motivators

Self-Talk—What Works?

Can people motivate themselves to exercise? One telephone interview study of men and women aged 40-plus years obtained extensive information about exercise-related self-talk (Cousins & Gillis 2005). For those who were insufficiently active, much of the self-talk represented either wishful thinking or self-defeating expressions such as "I'm too tired." Among active adults, a trend indicated that "Just do it" thinking was most productive. The most active adults avoided arguing about exercising and simply stuck to their "nonnegotiable" plans.

Enjoyment

Contrary to one Belgian study in which enjoyment didn't surface as a strong motivator for exercise (De Bourdeaudhuij & Sallis 2002), other studies indicated that enjoyment could play a key role. A longitudinal study of 500 female runners over a 2-year period found that those who enjoyed the activity were far more likely to continue (Titze, Stronegger & Owen 2005). A laboratory study on relatively inactive adults supported this conclusion (Parfitt & Gledhill 2004). Participants indicated their preferences among three aerobic workouts and then performed each of them for 20 minutes. After their preferred training, their fatigue, psychological distress and reported difficulty were lower, while their sense of positive well-being was higher. Since the work rates were roughly equivalent for all three exercise modes, these differences are remarkable.

Personal Focus

Two studies provided hints about factors that might enhance enjoyment and intrinsic motivation. One study of 261 women in aerobic dance classes found that focusing on the class itself and on developing skill and competence served to enhance interest and enjoyment more than comparing oneself to others or trying to be the best (Boyd, Weinmann & Yin 2002). A related study of 695 college students showed that emphasizing the personal value of an activity or its relevance to one's future increased motivation, while a focus on "having to do" the activity decreased incentives (Simons, Dewitte & Lens 2003).

The Study Methods

We used the database of the American Psychological Association to search for relevant books, dissertations and studies published from January 2002 to October 2005, using the keywords *exercise psychology*. In choosing what to review, we limited ourselves to actual studies (vs. opinion pieces, textbooks or philosophical

issues) that disclosed what researchers found in empirical investigations.

Competition and the Type A Personality

What kind of exercise would you recommend for your competitive, aggressive client—the one who seems to feel a sense of urgency about almost everything? One study looked at the responses of type A individuals assigned to either a competitive or a noncompetitive sports activity. An interesting finding was that after participating in a noncompetitive activity, these individuals showed more positive moods—and less anxiety, depression and anger—than the type A individuals who played a competitive sport (Masters, Lacaille & Shearer 2003). Though these findings are encouraging, it is questionable whether you would be able to convince your type A client to choose noncompetitive activities!

The Theory of Planned Behavior

Of all the theories underlying exercise psychology research, one model seems to capture the limelight. The Theory of Planned Behavior (TPB) describes what influences people to act the way they do (Ajzen 1988; Ajzen 1991)—or, in the context of exercise psychology, what propels people from sedentary to active lifestyles. TPB is one of the models most often used to understand exercise behavior (Hausenblas & Symons Downs 2004; Payne, Jones & Harris 2004) and predict the adoption and maintenance of that behavior.

TPB Model

Imagine that you have a client who is determined to exercise more regularly. This **behavior** is her goal. According to TPB, her behavior will be influenced by four other factors: **intentions**, **attitudes**, **subjective norms** and **perceived behavioral control**. (See “Factors Influencing Planned Behavior” on page 43.)

Applying TPB

To help you use this model with your imagined client, here are definitions of the five components, coupled with sample questions to ask in order to empower her to reach her intended goal (Rhodes & Courneya 2003; Rhodes, Courneya & Jones 2003). Before you start, it is important to specifically define the desired behavior. For example, if you want to determine whether a client will exercise five times a week for the next 3 months, ask all your questions using this definition.

Behavior is the specific action that your client wants to engage in—for instance, training for 30 minutes a day, five times a week, at 65%–75% of VO₂max.

Ask: What's your goal? What do you need to do on a daily and weekly basis to reach your goal?

Intention is the most important component, since it directly influences behavior. Ask your client straightforward questions about what she intends to do. *Ask:* How strong is your desire to reach your goal? How motivated do you feel? How hard and long are you willing to work for it?

Attitudes are your client's positive or negative beliefs about the outcomes of the behavior and the importance she places on these outcomes.

Ask: What are the pros and cons of doing this? How useless/useful, harmful/beneficial, unpleasant/pleasant and stressful/relaxing would it be for you to adopt this new behavior?

Subjective norms are beliefs about what others think. Of course, the influence of others is only as strong as your client's willingness to seek their approval!

Ask: What do others close to you think about what you intend to do? How much do you care?

Perceived behavioral control refers to your client's beliefs about her ability to fulfill her intention. These beliefs derive from internal and external resources that can help, and barriers that can hinder, goal achievement (Hagger, Chatzisarantis & Biddle 2002). Having more resources than barriers will encourage your client to act on her intentions.

Ask: How confident are you that you can do this? How hard or easy do you think it will be? Do you believe you have what it takes? How much control do you feel you have? What do you have to face to reach your goal? What are your resources? What do you see as barriers?

The more positive your client's answers are, the greater the chances are that she will take action. If you find that answers in one area are negative, target this area to strengthen your client's intention.

Is exercise considered a "necessary evil"? And if so, how might this contribute to low participation rates?

Are There Any Possible Drawbacks to Regular Exercise?

We've discussed overwhelming evidence citing the many benefits of regular exercise, but are there any drawbacks? Well, nothing is perfect, and we did find

one cautionary study. Highly experienced runners (average years of running = 7.5) who trained at least five times a week volunteered for a 1-day “deprivation of training.” At the end of this day, they experienced withdrawal-like symptoms of depressed mood; reduced vigor; and increases in tension, anger, fatigue and confusion (Aidman & Woollard 2003). Though these mood states were transitory, this study signals the importance of understanding that some individuals might use exercise regimens to avoid dealing with life issues.

Inspiring Clients to an Active Lifestyle

How can you increase the attractiveness of physical activity, especially to those who are sedentary or insufficiently active? As renowned sport and exercise psychologist William Morgan (2001) remarked a few years ago, “People give all sorts of reasons for not wanting to exercise . . . but I think the real reason is that they don’t want to do pointless, nonpurposeful things like running on a treadmill.”

The fact is that meaning and purpose are what participants bring to their programs. Any physical activity can be meaningful when it relates to an individual’s sense of self or purpose in life. For most people, running on a treadmill is not an end in itself, but a means for experiencing life more fully and joyfully. Based on the research results, what are some steps you might take to help clients find that joy?

- In classes, cue participants to pay attention to their own experience rather than comparing themselves to others. Provide positive feedback about their technique.
- Emphasize the personal value of exercise and its relevance to your clients’ future, rather than presenting it as something they *have* to do. Encourage them to “own” their choice to be active.
- Help clients clarify and commit to a nonnegotiable plan of action.
- Given that many novice exercisers may not know what exercise they enjoy—or even what their choices are—try different activities and then check in regularly, asking, “Are you enjoying what you’re doing?”
- When designing programs for novice exercisers, closely supervise intensity, to avoid the negative feeling that can be generated by a transition to anaerobic metabolism.

References

Aidman, E.V., & Woollard, S. 2003. The influence of self-reported exercise addiction on acute emotional and physiological responses to brief exercise deprivation. *Psychology of Sport and Exercise*, 4 (3), 225–26.

- Ajzen, I. 1988. *Attitudes, Personality, and Behavior*. Milton Keynes, England: Open University Press.
- Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Arent, S.M., et al. 2005. Dose-response and mechanistic issues in the resistance training and affect relationship. *Journal of Sport & Exercise Psychology*, 27 (1), 92–110.
- Baden, D.A., Warwick-Evans, L., & Lakomy, J. 2004. Am I nearly there? The effect of anticipated running distance on perceived exertion and attentional focus. *Journal of Sport & Exercise Psychology*, 26 (2), 215–31.
- Blanchard, C.M., Rodgers, W.M., & Gauvin, L. 2004. The influence of exercise duration and cognitions during running on feeling states in an indoor running track environment. *Psychology of Sport and Exercise*, 5 (2), 119–33.
- Boyd, M.P., Weinmann, C., & Yin, Z. 2002. The relationship of physical self-perceptions and goal orientations to intrinsic motivation for exercise. *Journal of Sport Behavior*, 25 (1), 1–18.
- Colcombe, S., & Kramer, A.F. 2003. Fitness effects on the cognitive function of older adults: A meta-analytic study. *Psychological Science*, 14 (2), 125–30.
- Cone, T.B. 2002. The effects of different types of exercise on the self-perceived levels of job performance of full-time university faculty and staff. *Dissertation Abstracts International, Section A: Humanities & Social Sciences*, 63 (1-A), 127.
- Cousins, S.O., & Gillis, M.M. 2005. “Just do it . . . before you talk yourself out of it”: The self-talk of adults thinking about physical activity. *Psychology of Sport and Exercise*, 6 (3), 313–34.
- Crews, D.J., Lochbaum, M.R., & Landers, D.M. 2004. Aerobic physical activity effects on psychological well-being in low-income Hispanic children. *Perceptual and Motor Skills*, 98 (1), 319–24.
- Crone, D., Smith, A., & Gough, B. 2005. “I feel totally at one, totally alive and totally happy”: A psycho-social explanation of the physical activity and mental health relationship. *Health Education Research*, 20 (5), 600–11.
- Daley, A.J., & Maynard, I.W. 2003. Preferred exercise mode and affective responses in physically active adults. *Psychology of Sport and Exercise*, 4 (4), 347–56.
- Daubenmier, J.J. 2003. A comparison of Hatha yoga and aerobic exercise on women’s body satisfaction. *Dissertation Abstracts International, Section B: The Sciences & Engineering*, 63(9-B), 4415.

De Bourdeaudhuij, I., & Sallis, J. 2002. Relative contribution of psychosocial variables to the explanation of physical activity in three population-based adult samples. *Preventive Medicine, 34*, 279–88.

Edwards, D.J., Edwards, S.D., & Basson, C.J. 2004. Psychological well-being and physical self-esteem in sport and exercise. *International Journal of Mental Health Promotion, 6* (1), 25–32.

Furnham, A., Badmin, N., & Sneade, I. 2002. Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *Journal of Psychology: Interdisciplinary and Applied, 136* (6), 581–96.

Gavin, J. 2005. *Lifestyle Fitness Coaching*. Champaign, IL: Human Kinetics.

Gavin, J., & Spitzer, M. 2002. The psychology of exercise. *IDEA Health & Fitness Source, 20*(10), 48–59.

Hagger, M.S., Chatzisarantis, N.L.D., & Biddle, S.J.H. 2002. A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology, 24* (1), 3–32.

Hall, E.E., Ekkekakis, P., & Petruzzello, S.J. 2002. The affective beneficence of vigorous exercise revisited. *British Journal of Health Psychology, 7* (1), 47–66.

Hansen, C.J., Stevens, L.C., & Coast, J.R. 2001. Exercise duration and mood state: How much is enough to feel better? *Health Psychology, 20* (4), 267–75.

Hardcastle, S., & Taylor, A.H. 2005. Finding an exercise identity in an older body: “It’s redefining yourself and working out who you are.” *Psychology of Sport and Exercise, 6* (2), 173–88.

Hausenblas, H.A., & Symons Downs, D. 2004. Prospective examination of the theory of planned behavior applied to exercise behavior during women’s first trimester of pregnancy. *Journal of Reproductive and Infant Psychology, 22* (3), 199–210.

Hentel, A.B. 2003. The relationship between excessive exercise and alexithymia in adult women. *Dissertation Abstracts International, Section B: The Sciences & Engineering, 63* (12–B), 6095.

Heyn, P. 2003. A meta-analysis of the effects of exercise training and physical activity on health-related physical fitness, cognitive and physical functioning, and behavior of individuals with Alzheimer’s disease and related cognitive disorders. *Dissertation Abstracts International, Section B: The Sciences & Engineering, 63* (11–B), 5190.

- Ingledeu, D., & Sullivan, G. 2002. Effects of body mass and body image on exercise motives in adolescence. *Psychology of Sport and Exercise*, 3 (4), 323–38.
- Kirkcaldy, B.D., Shephard, R.J., & Siefen, R.G. 2002. The relationship between physical activity and self-image and problem behaviour among adolescents. *Social Psychiatry and Psychiatric Epidemiology*, 37 (11), 544–50.
- Kruisselbrink, L.D., et al. 2004. Influence of same-sex and mixed-sex exercise settings on the social physique anxiety and exercise intentions of males and females. *Journal of Sport & Exercise Psychology*, 26 (4), 616–22.
- Latimer, A.E., Martin Ginis, K.A., & Hicks, A.L. 2005. Buffering the effects of stress on well-being among individuals with spinal cord injury: A potential role for exercise. *Therapeutic Recreation Journal*, 39 (2), 131–38.
- Manger, T.A., & Motta, R.W. 2005. The impact of an exercise program on posttraumatic stress disorder, anxiety, and depression. *International Journal of Emergency Mental Health*, 7 (1), 49–57.
- Masters, K.S., Lacaille, R.A., & Shearer, D.S. 2003. The acute affective response of Type A behaviour pattern individuals to competitive and noncompetitive exercise. *Canadian Journal of Behavioural Science*, 35 (1), 25–34.
- McDowell-Larsen, S.L., Kearney, L., & Campbell, D. 2002. Fitness and leadership: Is there a relationship? Regular exercise correlates with higher leadership ratings in senior-level executives. *Journal of Managerial Psychology*, 17 (4), 316–24.
- Morgan, W.P. 2001. Prescription of physical activity: A paradigm shift. *Quest*, 53, 366–82.
- Netz, Y., & Lidor, R. 2003. Mood alterations in mindful versus aerobic exercise modes. *Journal of Psychology: Interdisciplinary and Applied*, 137 (5), 405–19.
- O'Halloran, P.D., Murphy, G.C., & Webster, K.E. 2004. Mood during a 60-minute treadmill run: Timing and type of mood change. *International Journal of Sport Psychology*, 35 (4), 309–27.
- Oliver, K., & Cronan, T.A. 2005. Correlates of physical activity among women with fibromyalgia syndrome. *Annals of Behavioral Medicine*, 29 (1), 44–53.
- Osei-Tutu, K.B., & Campagna, P.D. 2005. The effects of short- vs. long-bout exercise on mood, VO₂max and percent body fat. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, 40 (1), 92–98.
- Parfitt, G., & Gledhill, C. 2004. The effect of choice of exercise mode on psychological responses. *Psychology of Sport and Exercise*, 5 (2), 111–17.

- Payne, N., Jones, F., & Harris, P.R. 2004. The impact of job strain on the validity of the theory of planned behaviour: An investigation of exercise and healthy eating. *British Journal of Health Psychology*, 10, 115–31.
- Penedo, F.J., & Dahn, J.R. 2005. Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18 (2), 189–93.
- Perri, M.G., et al. 2002. Adherence to exercise prescriptions: Effects of prescribing moderate versus higher levels of intensity and frequency. *Health Psychology*, 21 (5), 452–58.
- Pinto, B.M., et al. 2003. Psychological and fitness changes associated with exercise participation among women with breast cancer. *Psycho-Oncology*, 12 (2), 118–26.
- Plante, T.G., et al. 2003a. Does virtual reality enhance the management of stress when paired with exercise? An exploratory study. *International Journal of Stress Management*, 10 (3), 203–16.
- Plante, T.G., et al. 2003b. Might virtual reality promote the mood benefits of exercise? *Computers in Human Behavior*, 19 (4), 495–509.
- Rhodes, R.E., & Courneya, K.S. 2003. Investigating multiple components of attitude, subjective norm, and perceived control: An examination of the theory of planned behaviour in the exercise domain. *British Journal of Social Psychology*, 42, 129–46.
- Rhodes, R.E., Courneya, K.S., & Jones, L.W. 2003. Translating exercise intentions into behavior: Personality and social cognitive correlates. *Journal of Health Psychology*, 8 (4), 447–58.
- Rocheleau, C.A., et al. 2004. Moderators of the relationship between exercise and mood changes: Gender, exertion level, and workout duration. *Psychology & Health*, 19 (4), 491–506.
- Rochholz, D.G. 2004. Age, sex, and socioeconomic status: Related factors in motivations for exercise. *Dissertation Abstracts International, Section A: Humanities & Social Sciences*, 64 (8-A), 282.
- Rodgers, W.M., et al. 2002a. The motivational implications of characteristics of exercise bouts. *Journal of Health Psychology*, 7 (1), 73–83.
- Rodgers, W.M., et al. 2002b. Task and scheduling self-efficacy as predictors of exercise behavior. *Psychology & Health*, 17 (4), 405–16.

- Rojas, R., Schlicht, W., & Hautzinger, M. 2003. Effects of exercise training on quality of life, psychological well-being, immune status, and cardiopulmonary fitness in an HIV-1 positive population. *Journal of Sport & Exercise Psychology*, 25 (4), 440-55.
- Simons, J., Dewitte, S., & Lens, W. 2003. "Don't do it for me. Do it for yourself!" Stressing the personal relevance enhances motivation in physical education. *Journal of Sport & Exercise Psychology*, 25 (2), 145-60.
- Strelan, P., Mehaffey, S.J., & Tiggemann, M. 2003. Self-objectification and esteem in young women: The mediating role of reasons for exercise. *Sex Roles*, 48 (1-2), 89-95.
- Thome, J., & Espelage, D.L. 2004. Relations among exercise, coping, disordered eating, and psychological health among college students. *Eating Behaviors*, 5 (4), 337-51.
- Titze, S., Stronegger, W., & Owen, N. 2005. Prospective study of individual, social, and environmental predictors of physical activity: Women's leisure running. *Psychology of Sport and Exercise*, 6 (3), 363-76.
- Trujillo, K.M., Brougham, R.R., & Walsh, D.A. 2004. Age differences in reasons for exercising. *Current Psychology: Developmental, Learning, Personality, Social*, 22 (4), 348-65.
- Ur, M.Y. 2001. A comparison of employees' participation patterns in corporate fitness programs and influential factors that affect personal job performance. *Dissertation Abstracts International, Section A: Humanities & Social Sciences*, 62 (4-A), 1362.
- U.S. Department of Health and Human Services. 2002. Physical activity fundamental to preventing disease (monograph, June 2002). <http://aspe.hhs.gov/health/reports/physicalactivity/index.shtml>; retrieved October 19, 2005.
- Whaley, D.E. 2003. Future-oriented self-perceptions and exercise behavior in middle-aged women. *Journal of Aging and Physical Activity*, 11 (1), 1-17.
- Winingar, S.R., & Pargman, D. 2003. Assessment of factors associated with exercise enjoyment. *Journal of Music Therapy*, 40 (1), 57-73.
- Woo, E., & Sharps, M.J. 2003. Cognitive aging and physical exercise. *Educational Gerontology*, 29 (4), 327-37.

-/-