Social Influence and Exercise: A Meta-Analysis

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Using meta-analysis, the impact of a number of manifestations of social influence (important others, family, class leaders, coexercisers, social cohesion, and task cohesion) on exercise behaviors (adherence and compliance), cognitions (intentions and efficacy), and affect (satisfaction and attitude) was examined. The results showed that social influence generally has a small to moderate positive effect (i.e., effect size [ES] from .20 to .50). However, four moderate to large effect sizes (i.e., ES from .50 to .80) were found: family support and attitudes about exercise, task cohesion and adherence behavior, important others and attitudes about exercise, and family support and compliance behavior.

Key words: exercise involvement, adherence

An ongoing concern in the exercise sciences has been identifying effective promotional strategies at the societal level and intervention strategies at the group level to enhance adherence, compliance, or both in exercise programs (cf. Carron & Spink, 1993; Quinney, Gauvin, & Wall, 1994; Wankel & Mummery, 1994). As Dishman (1994) noted,

Since 1988 several scientific and professional consensus meetings sponsored by governments in Great Britain, Canada, and the United States have focused on the problem of understanding and increasing leisure-time physical activity. Interest in exercise adherence continues to grow in Europe and Australia. (p. vii)

One reason for this interest is that research has shown that regular participation in physical activity is associated with a large number of psychological, physical, and physiological benefits.

Among the psychological benefits, for example, are reductions in state anxiety, decreases in the levels of mild to moderate depression, positive changes in personality for the traits of anxiety and neuroticism, and improvements in various stress indices (International Society of Sport Psychology, 1991). In addition, exercise has positive emotional effects for both sexes across all ages and

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can be a positive adjunct in the professional treatment of severe depression (International Society of Sport Psychology, 1991).

Among the positive physical and physiological changes identified are improvements in maximum oxygen uptake, decreases in percent body fat, decreases in body weight, decreases in blood pressure, improvements in flexibility, reductions in orthopedic spinal problems, changes toward a lower resting heart rate, and decreases in stress-related indicators such as cholesterol and triglyceride levels in the blood (cf. Hill, Glassford, Burgess, & Rudnicki, 1988).

Despite the substantial benefits associated with involvement in physical activity, epidemiological studies have shown that 41 to 51% of individuals between the ages of 18 and 65 are sedentary (National Center for Health Statistics, 1980). It also has been well-documented that exercise programs have difficulty in retaining participants. Typically, there is a 20 to 50% withdrawal rate in participation in the first 6 months of an exercise program (Dishman, 1988; Oldridge, 1984; Ward & Morgan, 1984).

As indicated above, the question of how to alleviate problems associated with nonadherence is viewed as important. How can we effectively intervene to enhance adherence? One of the principal strategies used to address this question has been to identify the profile of correlates associated with nonadherence. Franklin (1988) has conveniently categorized the factors that correlate with nonadherence under three profile headings: personal, program, and other.

Components of the personal profile include smoker, inactive in leisure time, blue-collar occupation, type-A personality, increased physical strength, poor credit rating, overweight or overfat, low self-esteem, depression, hypochondria, anxiety, and low ego strength. The program factors found to be associated with exercise nonadherence are inconvenient time/location, excessive cost, lack of exercise variety, high intensive exercise, exercise alone, lack of positive feedback or reinforcement, inflexible exercise goals, low enjoyability ratings for running, and poor leadership. And, finally, under the category of other factors, Franklin identified lack of spouse support, inclement weather, excessive job travel, injury, medical problems, and job change/move.

Although the personal factors listed by Franklin might be useful to reliably describe, predict, or explain exercise adherence, it should be apparent that, ultimately, these factors will be of little or no value in any intervention program. Personality traits, for example, are very resistant to change, and influencing economic factors (e.g., blue collar, poor credit rating) is outside the domain of the sport scientist, medical practitioner, health promotion professional, or exercise leader.

An examination of the list of other factors summarized by Franklin contributes to a suggestion that most of these are not subject to intervention—the weather, job travel, injury, medical problems, and job change/move, for example. The sole exception is spousal support.

The program factors identified by Franklin appear to have the potential for intervention. Over a decade ago, in a discussion on cardiac rehabilitation, Oldridge et al. (1983) noted,

The supportive aspects of group interaction, whether emotional, social, educational, or some other known or unknown factors, together with modification of coronary-prone behavior, including an increase in exercise habits,
are important in minimizing the incidence and severity of complication after myocardial infarction. (p. 73)

Subsequent research reported since the Oldridge et al. (1983) work has contributed to the suggestion that social influence is positively linked to exercise involvement. Social influence is “either real or imagined pressure to change one’s behavior, attitudes or beliefs” (Alcock, Carment, & Sadava, 1991, p. 195). Many of the program factors (as well as spousal support) identified by Franklin (1988) are a manifestation of social influence. And, as Baron and Byrne (1991) pointed out, “Perceptions, attitudes, and actions are strongly affected by other persons, either individually or collectively. In short, our behavior and thoughts are very different from what they would be if we lived in total isolation” (p. 311).

The general purpose of the present study was to quantify, through the use of meta-analysis, the impact of social influence on exercise involvement. When we initiated the literature search for the meta-analysis, it became apparent that exercise involvement (considered a dependent variable) has been operationally defined in a variety of ways. For example, one general line of research has examined the impact of others’ influence on individual exercise behavior including both adherence (e.g., Massie & Shephard, 1971) and compliance (e.g., Daltroy & Godin, 1989). (The distinction between these two is that adherence is behavior that is self-selected and initiated, whereas compliance is behavior that is required or prescribed by others, such as a health-care professional.) Other research has provided evidence relating to the impact of others’ influence on individual cognitions about exercise including intention (e.g., Wankel & Mumery, 1994) and self-efficacy (e.g., Yordy & Lent, 1993). Finally, other research has examined the impact of others’ influence on individual affect associated with exercise, including attitudes about exercise (e.g., Godin, Vezina, & Leclerc, 1989) and satisfaction with the exercise experience (e.g., Carron & Spink, 1993).

Similarly, it became apparent that social influence as an independent variable has been operationally defined in a variety of ways in the exercise literature. The six major sources of social influence examined include important others such as physicians or work colleagues (e.g., Anderssen & Wold, 1992), family members (e.g., Miller, Johnson, Garrett, Wickoff, & McMahon, 1982), exercise instructors or other in-class professionals (Atkins, Kaplan, Timms, Reinsch, & Lofback, 1984), other coexercisers (e.g., Clifford, Tan, & Gorsuch, 1991), and social and task cohesive exercise groups (e.g., Spink & Carron, 1994).

Given the breadth of the operational measures of exercise involvement and social influence, a decision was made to examine the various combinations in a series of independent meta-analyses. Thus, the specific purpose of the study was to examine independently the impact of six sources of social influence (important others, family, exercise leaders, coexercisers, social cohesion, and task cohesion) on two manifestations of exercise behavior (adherence and compliance), two types of cognitions associated with exercise (intention and self-efficacy), and two types of affect associated with exercise involvement (satisfaction and attitude).

Method

Selection of the Data

The data for the study were generated through three principal sources: computer searches, manual searches, and journal searches. The computer searches
used PsychLIT, MEDLINE, and SPORTdiscus. Manual searches were conducted using the reference lists from recent comprehensive empirical and narrative reviews (e.g., Dishman, 1988, 1994; Godin, 1994; Quinney et al., 1994). Finally, 12 journals considered likely to have pertinent research were examined from at least 1975 to the present (i.e., some of the journals did not publish prior to 1975): Canadian Journal of Applied Sport Sciences, Health Psychology, International Journal of Sport Psychology, Journal of Applied Sport Psychology, Journal of Behavioral Medicine, Journal of Sport & Exercise Psychology, Journal of Sport Behavior, Journal of Sport Medicine and Physical Fitness, Journal of Sport Sciences, Perceptual and Motor Skills, Research Quarterly for Exercise and Sport, and The Sport Psychologist.

The criteria for initial selection was the presence of key words: adherence, compliance, social support, dropout, aerobic, spousal support, motivation, satisfaction, exercise, physical activity, exercise behavior, attendance, attitude, and intention. Studies were discarded from further consideration if they either failed to compare the effect of at least one level of social influence on individual behavior, cognitions, or affect, or if they failed to provide usable statistics to compute an effect size. Five studies identified as consistent with the purpose of the study were not used because they failed to include statistics usable for meta-analysis.

Considerable discussion has revolved around the question of how many results should be used from the same study (cf. Wolf, 1986). In analyzing studies for the present meta-analysis, it became apparent that in some studies comparisons were made on more than one dependent variable. In those cases, a separate effect size (ES) was computed for each dependent variable. Thus, for example, if a study focused on the impact of a supportive family on adherence (behavior), efficacy for exercise (cognition), and satisfaction with the exercise experience (affect), three ESs were computed.

In other studies, multiple results pertaining to the same dependent variable were available. In those cases, an average ES was computed. Thus, for example, if a study examined the relationship between family support and exercise behavior at 1 month and 6 months, one (average) ES was computed from the two results.

Finally, in other studies, multiple results pertaining to different levels of the independent variable were available. In those instances, an ES was computed for each result. Thus, for example, a study might have evaluated the influence of social support provided by spouses, children, exercise partners, physicians, and exercise leader. Because of the coding scheme utilized (which is discussed subsequently), an average ES was computed from the spouse and children data, and three separate ESs were calculated from the exercise partners, physician, and exercise leader data.

A total of 87 studies containing 49,948 participants with 224 ESs were included in the meta-analysis. Table 1 provides a summary of the number of studies and participants in the categories subjected to meta-analysis. Citations of the studies used are presented in the Appendix. A summary table showing the specific coding for each study (as well as the resulting effect size) is available from the first author.

**Coding of the Data**

Initially, each study was coded on the basis of the nature of the social influence and the dependent measure examined. The nature of the social influence
Table 1  Summary of Number of Studies, the Number of Participants in Those Studies, the Resulting Effect Size (ES), 95% Confidence Intervals (CI), and Fail-Safe Number of Studies (FSn)

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. studies</th>
<th>No. participants</th>
<th>ES</th>
<th>SD</th>
<th>CI</th>
<th>FSn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence behavior and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task cohesion</td>
<td>6</td>
<td>581</td>
<td>.62</td>
<td>.26</td>
<td>1.13 to 0.12</td>
<td>4</td>
</tr>
<tr>
<td>Important others</td>
<td>21</td>
<td>7,887</td>
<td>.44</td>
<td>.12</td>
<td>0.20 to 0.67</td>
<td>10</td>
</tr>
<tr>
<td>Family</td>
<td>53</td>
<td>13,593</td>
<td>.36</td>
<td>.18</td>
<td>0.01 to 0.72</td>
<td>4</td>
</tr>
<tr>
<td>Class members</td>
<td>22</td>
<td>6,139</td>
<td>.32</td>
<td>.22</td>
<td>0.80 to −0.13</td>
<td>8</td>
</tr>
<tr>
<td>Class leader</td>
<td>9</td>
<td>533</td>
<td>.31</td>
<td>.31</td>
<td>0.92 to −0.29</td>
<td>4</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>4</td>
<td>291</td>
<td>.25</td>
<td>.28</td>
<td>0.80 to −0.30</td>
<td>1</td>
</tr>
<tr>
<td>Compliance behavior and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>6</td>
<td>587</td>
<td>.69</td>
<td>.14</td>
<td>0.96 to 0.41</td>
<td>5</td>
</tr>
<tr>
<td>Intention to exercise and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>27</td>
<td>8,328</td>
<td>.49</td>
<td>.08</td>
<td>0.65 to 0.34</td>
<td>12</td>
</tr>
<tr>
<td>Important others</td>
<td>6</td>
<td>1,293</td>
<td>.44</td>
<td>.12</td>
<td>0.67 to 0.20</td>
<td>3</td>
</tr>
<tr>
<td>Efficacy for exercise and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>3</td>
<td>866</td>
<td>.40</td>
<td>.05</td>
<td>0.63 to 0.16</td>
<td>1</td>
</tr>
<tr>
<td>Affect with exercise and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important others</td>
<td>5</td>
<td>997</td>
<td>.63</td>
<td>.08</td>
<td>0.79 to 0.48</td>
<td>4</td>
</tr>
<tr>
<td>Family</td>
<td>11</td>
<td>2,941</td>
<td>.59</td>
<td>.07</td>
<td>0.73 to 0.46</td>
<td>7</td>
</tr>
</tbody>
</table>

was coded according to whether the study examined the impact of (a) important others (e.g., physicians, work colleagues), (b) family (e.g., spouse, children), (c) instructors or other professionals within the exercise environment, (d) the presence of other exercise participants, (e) social cohesion in the exercise group, or (f) task cohesion in the exercise group.

In some studies, a broad operational definition of social influence was used that incorporated both family members and important others. In those instances, the nature of the social influence was categorized as family support.

In some studies, the influence of others on the participant’s exercise involvement was assessed through the use of psychological inventories. Although the results derived from these psychological inventories were not directly relevant to the purpose of the study, these data were also coded and examined. Two categorizations of results were coded. The first came from studies in which a psychological test assessed the need for affiliation (i.e., Is a high need for affiliation related to exercise adherence?). The second came from studies in which a psychological test assessed the degree to which powerful external others represented the locus of control for exercise involvement (i.e., Are nonadherers to exercise programs characterized by an external locus of control?).

The dependent measure—exercise involvement—was comprised of three general types of outcomes: behavior, cognitions, and affect. Two behaviors were recorded: adherence and compliance. Two cognitions were recorded: intention
to exercise and self-efficacy for exercise. Finally, two measures of affect were recorded: attitude toward exercise and satisfaction with exercise.

Given that six measures of social influence (important others, family, class members, instructors, social cohesion, task cohesion) and six types of exercise involvement (adherence, compliance, efficacy, intention, attitude, satisfaction) were coded, it was theoretically possible to carry out 36 analyses. Following the lead of Thomas and French (1985), a meta-analysis was undertaken only in those instances where three or more ESs were available. For adherence behavior, it was possible to calculate an ES for each type of social influence. However, for compliance behavior, efficacy, intention, and attitude, all types of social influence were not sufficiently represented in every category. Only three studies (across two categories of exercise involvement) were found in which satisfaction was examined, so a decision was made to combine satisfaction and attitude into one category that was relabeled affect.

Computation of ES

The statistical techniques used to compute ES were those outlined by Hedges (1981, 1982) and Hedges and Olkin (1985) and summarized by Thomas and French (1986). That is, because ESs are positively biased in small samples, a correction factor was used on each ES prior to subsequent analyses. Also, each ES was then weighted by the reciprocal of its variance prior to combining ESs. An overall weighted mean estimate was then obtained using the formula provided by Hedges and Olkin (1985). Finally, an estimate of the variance of ES was obtained, again using the formula provided by Hedges and Olkin (1985). The designation ES is used in the present report (rather than ES') to represent effect sizes that underwent all of the above transformations.

Results

General Analyses

Initially, our interest was in determining whether there was homogeneity in ES within the total sample. The H statistic was computed using the weighted sum of squared deviations of ES from the overall weighted mean ES (Hedges & Olkin, 1985). The results showed that the distribution of ES was not homogeneous. \( \chi^2(223, N = 224) = 50.14, p < .01. \)

Table 1 presents an overview of the ES obtained (along with their 95% confidence intervals) when the data were subjected to meta-analysis. Given Cohen’s (1969, 1992) suggestion that .20, .50, and .80 represent small, medium, and large effect sizes, respectively, it is apparent that the majority of the ESs are in the small to medium range. There are four exceptions—all of which are in the medium to large range. These are associated with the impact of (a) family support on affect associated with exercise involvement (ES = .59), (b) task cohesion in the exercise class on adherence behavior (ES = .62), (c) important others on affect associated with exercise involvement (ES = .63), and (d) family support on compliance behavior (ES = .69).

As Table 1 shows, there is a marked contrast between the impact of family support on adherence (ES = .36) versus the impact of family support on
compliance (ES = .69). This difference was statistically significant \( t(57) = 5.32, p < .001 \). Support from family members is almost twice as important when the individual is complying to an exercise prescription set out by a health professional than when the individual is exercising in a self-selected and initiated program.

As Table 1 shows, the 95% confidence intervals associated with the ES for the influence of class members, class leaders, and social cohesion on adherence behavior include zero. Thus, these effects should be considered zero-order.

A number of authors have discussed the file drawer issue—the question of how many unlocated studies with null effects would have to be found to reduce the ES to a zero-order or minimal level (cf. Hunter & Schmidt, 1990; Rosenthal, 1979; Wolf, 1986). This question is particularly relevant in the present study given the relatively small number of studies that contributed to the computations of some of the average ESs. Consequently, a fail-safe \( N \) was computed to determine the number of unlocated, unpublished, or currently uncompleted studies that would be needed to reduce the average ES to a critical value of .10—the smallest ES that we would consider theoretically and practically important. We used a formula outlined by Hunter and Schmidt (1990), which is relatively conservative. As they noted, using their formula, “the number of missing studies averaging null results needed to reduce the effect size to \( \text{ES} = .10 \) is usually much smaller than the number required to reduce the combined probability value to \( p = .05 \)” (Hunter & Schmidt, 1990, p. 513).

The results are presented in Table 1. Although the fail-safe \( Ns \) are quite conservative, when they are considered in concert with the data pertaining to the 95% confidence intervals, it is reasonable to suggest that many of the ES should be viewed with caution.

**Analyses From Psychometric Tests of Social Influence**

Sufficient studies were available to examine the impact of social influence assessed through the use of psychometric tests on adherence behavior only. The results showed that powerful (external) others have a small negative impact on adherence behavior (ES = \(-.18, SD = .12\); 95% confidence interval [CI] = .05 to \(-.42\); fail-safe \( N = 1 \)). In short, when the exercise participant holds the perception that the locus of control resides in the hands of powerful others, adherence behavior suffers, but the effect is small.

Psychological tests that assess affiliation motives/incentives appear to have no utility in accounting for adherence behavior; the ES is zero-order (ES = \(-.06, SD = .14\); CI = .55 to \(-.69\); fail-safe \( N = 1 \)). As was the case above, however, the magnitude of the ESs in concert with the confidence interval and fail-safe \( N \) contribute to a suggestion that any conclusion about the relationship of psychological tests to adherence behavior must be viewed with caution.

**Discussion**

The results of the meta-analysis support an overall conclusion that social influence has a positive influence on exercise behavior (both adherence and compliance), cognitions about exercise involvement (both intentions to exercise and efficacy for exercise), and attitudes associated with the exercise experience.
Paper-and-pencil tests of social influence show that powerful (external) others have a small negative impact, whereas affiliation motives/incentives appear to have no utility in accounting for adherence behavior.

One of the strongest ESs obtained was for the relationship of social influence of the family on compliance behavior (see Table 1). As was pointed out above, family members have almost twice as much impact when the individual is complying to an exercise prescription set out by a health professional than when the individual is adhering to a self-selected, personally initiated program. At least, these results have strong implications for the implementation of programs involving exercise compliance. Spouses and other family members of individuals entering into a exercise compliance program should be instructed prior to the onset and throughout the course of the program to provide constant encouragement. The present results clearly show that compliance will be enhanced.

However, an examination of other ESs reported in Table 1 shows that the family does not represent the strongest source of social influence for adherence behavior. The influence of important others is slightly larger, and the presence of a task-cohesive group has almost twice the social impact of family. We were unable to examine the impact of important others or task cohesion on compliance in our meta-analysis—no data were available. It could be hypothesized, however, that the support of important others and the presence of a highly cohesive group would have at least the same impact on compliance as on adherence. If that is the case, there are implications for the implementation of intervention programs. One possible implication is that encouragement from important others (such as friends, physicians, or employers) at the onset and throughout a program is likely to have a strong impact on compliance. A second possible implication is that developing a highly cohesive group that is focused on the exercise task and the outcomes it can produce is likely to have a strong impact on compliance. The impact of both cohesion and important others on compliance should be addressed through future research.

The superiority of important others over family support insofar as both adherence behavior and attitudes associated with exercise involvement (see Table 1) was somewhat surprising. Intuitively, it seemed reasonable to predict that family members (spouses, parents, children) would possess greater social influence than friends, physicians, or employers. Possibly the present results can be interpreted in light of research which has indicated that social reinforcement (e.g., praise, criticism, favorable gestures, frowns, smiles) contains both informational and motivational components. Also, social reinforcement contains more information and, therefore, has more social influence when it is administered infrequently or by an individual who is less well known (cf. Carron, 1984; Stevenson, 1965). Consequently, support from important others may be superior to support from family for two reasons. First, support from others may provide more information that the individual is engaged in a worthwhile activity. Second, social reinforcement from friends is received relatively less frequently than from family. Thus, it may serve as a stronger source of motivation and lead to more positive attitudes in the exercise participant.

The effect of family and important others on affect associated with exercise involvement is in the medium to large range. In fact, family and important others have more impact on affect than they do on either intention to exercise or exercise adherence itself. This is not surprising. As Wilson, Lisle, Kraft, and Wetzel
(1989) noted, when individuals hold an expectation about how they will react to a situation, these expectations shape both their cognitions and their subsequent affect. Thus, with the positive endorsement (i.e., support) of exercise from family and important others, it is likely that individuals will prejudge the experience as more favorable. And, in a self-fulfilling prophecy, they will derive more enjoyment or satisfaction.

The negative effect size for the relationship between powerful others (as measured by psychological inventories) and adherence behavior is consistent with our conceptual understanding of intrinsic motivation. Deci (1975) has proposed that intrinsically motivated behavior is founded on the need to feel competent and self-determining. When perceptions of competence or self-determination are undermined, intrinsic motivation diminishes and persistence in voluntary activities is reduced (cf. Lepper & Greene, 1975; Lepper, Green, & Nisbett, 1973). If powerful others are considered the locus of control for exercise behavior, perceptions of self-determination may be undermined and adherence would deteriorate. When others (family, important others, class members, exercise leaders) provide support without exerting control over behavior, the individual has retained a perception of self-determination, and adherence should be enhanced.

Social influence can come from varied sources (family, important others, coexercisers, the class leader) and can have an impact on numerous manifestations of exercise involvement: behavior, cognitions, and affect. Our results showed that the social influence of others does make a difference in exercise involvement. However, our search for empirical data also showed that there are still numerous unexplored issues and unexplained findings. For example, insofar as both efficacy for exercise and compliance to exercise prescriptions are concerned, some relationships that either have not been explored or for which there is less than three studies concern the impact of important others, other class members, exercise leaders, and task and socially cohesive groups. Insofar as both intention to exercise and affect associated with the exercise experience are concerned, only two forms of social influence have been examined: important others and family. The field of social psychology provides testimony to the impact of social influence on human behavior, cognitions, and affect. Continued research is necessary for us to understand the broad impact of social influence on exercise involvement.

References


**Appendix**

*Studies Included in the Meta-Analysis*


Acknowledgments

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