The Relationships Among Adolescents’ Drive for Muscularity, Drive for Thinness, Doping Attitudes, and Doping Intentions

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This study examined the relative ways in which muscularity and thinness concerns longitudinally influence adolescents’ intentions to use doping substances. It was hypothesized that muscularity and thinness exert their effects on doping intentions by promoting endorsement of positive attitudes toward doping use in male and female adolescents and across different levels of sport involvement. To test this hypothesis, nearly 900 high school adolescents provided questionnaire data on two separate occasions during an academic year. On average, boys, as well as boys who practice some sport, had relatively strong concerns about muscularity, whereas girls showed relatively strong thinness concerns. Boys also expressed more positive attitudes about doping than did girls. Structural equation modeling showed that muscularity and thinness have direct effects on adolescents’ intentions to engage in doping and that muscularity, but not thinness, partly exerts its effects through the endorsement of positive attitudes toward doping.

Keywords: body image, muscularity, slimness

In the popular media, doping use is typically viewed as a phenomenon that involves professional athletes and that represents the primary illicit means to enhance sport performance. This public view is in sharp contrast with the ways doping use has been investigated and conceptualized in the scientific psychological literature. First, research has demonstrated that doping use goes well beyond the realm of elite or professional sports. It is also found, albeit in relatively low percentages, among middle school and high school boys and girls who practice sports on an amateur level, with little variation in doping use across geographic regions, socioeconomic status, and educational levels (Yesalis & Bahrke, 2000). Second, even though athletic performance enhancement represents a key goal of doping users, many athletes use doping to improve their physical appearance and

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body shape (Durant, Escobedo, & Heart, 1995; Kindlundh, Isacson, Berglund, & Nyberg, 1999). Finally, the question of whether doping use improves one’s physical appearance depends on a host of factors ranging from existing socio-cultural models of body ideals to an individual athlete’s specific motives, concerns, goals, or practices (Labre, 2002; McCabe & Ricciardelli, 2003b; McCreary & Saucier, 2009; Ricciardelli & McCabe, 2004a, 2004c).

Thus, while the links between doping use and performance enhancement in sports may be viewed as being relatively straightforward, the study of doping use with respect to one’s body ideals or concerns about physical appearance involve complex patterns of cultural, social, personal, and behavioral factors. It is in line with this latter view that recent adolescence literature has addressed doping use with respect to broad topics such as body image concerns and dissatisfaction, self-esteem, eating disorders, and depression (Irving, Wall, Neumark-Sztainer, & Story, 2002; Ricciardelli & McCabe, 2004a). Much of this literature has been concerned with the body ideals that adolescents pursue along with the diverse behaviors and strategies adolescents adopt in their attempt to attain these ideals and exercise control over their body shape, weight, or physical development.

This research typically suggests that adolescent boys and girls have relatively distinct body ideals and tend to adopt different behavioral strategies to achieve satisfaction with their bodies. While females typically seek to become thinner, males frequently strive to increase their weight (McCreary & Sadava, 2001). In fact, research has shown that the majority of males want to be more muscular and often make the assumption that a muscular physique is more attractive to females (Jacobi & Cash, 1994). In contrast, women and girls typically strive for thinness and consider a fat-free lean body shape as the predominant body ideal for females (Strahan, Wilson, Cressman, & Buote, 2006). Interestingly, these stereotypical gender-laden body ideals and goals do not have a one-to-one correspondence with their respective gender groups. Although concerns about muscularity are more common among men (McCreary & Sadava, 2001) and boys (McCreary & Sasse, 2000), sociocultural pressures to obtain a muscular physique appear to be influencing certain subgroups of females as well. For example, a recent study found that adolescent girls perceived pressure to increase weight and increase muscle mass as well as to decrease weight. Furthermore, the degree of perceived pressure to increase weight predicted the use of strategies to increase weight and muscle tone, binge eating, and steroid use (McCabe & Ricciardelli, 2003a). Likewise, other research (Parks & Read, 1997) has suggested that many male athletes of high school or college age are not necessarily satisfied with their bodies, often considering themselves too heavy or wishing to lose weight.

Adolescents’ body ideals and their level of satisfaction with their bodies have three distinct sets of implications for the understanding of adolescents’ doping use. First, existing survey research suggests that doping use, at least in young male athletes and nonathletes, is partly regulated by their “drive for muscularity” (Dodge, Litt, Seitchik, & Bennett, 2008; McCreary & Sasse, 2000), that is, by their desire and actual attempts to attain a perfect body shape, increase their muscle mass, and closely monitor their muscle growth. To the extent, however, that both male and female adolescents may seek body ideals through complex cognitive and behavioral strategies, it is plausible that adolescents’ intentions to use doping substances may depend not only on a drive for muscularity but also on a “drive for thinness.” That
is, such intentions may also depend on their desires and deliberate attempts to achieve a thin or lean body, to prevent body fat gain, and to closely monitor body shape over time (Field et al., 2001; Garner, 1991; Garner, Garfinkel, Schwartz, & Thompson, 1980; Rosen & Gross, 1987). Second, in line with much health behavior research (Baranowski, Cullen, Niklas, Thompson, & Baranowski, 2003; Bryan, Kagee, & Broaddus, 2006; Hagger, Chatzisarantis, & Biddle, 2002), recent doping research designed to investigate doping use as a deliberate and volitional behavior has established that adolescents’ intentions to use and their actual use of doping substances are regulated by a series of social-cognitive processes (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008), including the key acquisition of positive attitudes and feelings toward doping substances.

Drives for muscularity and thinness represent two constructs that involve attitude acquisition, with the former focusing on and assessing the general attitudes and concerns individuals may hold with respect to body shape, muscle growth, and muscularity and the latter referring to an excessive concern with dieting, preoccupation with weight, and fear of gaining weight. To the extent that these drives tap into general attitudes, possibly promoting a variety of behaviors believed to resolve one’s body dissatisfaction, it is reasonable to hypothesize that they may contribute to adolescents’ specific acquisition of positive doping attitudes and in turn, these attitudes may contribute to adolescents’ intentions to use a variety of doping substances. Third, to the extent that muscularity and thinness concerns may find expression in adolescents’ involvement with sport activities, it is reasonable to hypothesize that the relationships between doping attitudes and the drives for muscularity and for thinness may vary across levels of adolescents’ sport involvement.

On these premises, the present study pursued two distinct empirical objectives. The first aim was to compare the relative influence that drive for muscularity and drive for thinness may have on adolescent boys and girls across levels of sport involvement, including effects on their doping attitudes and their intentions to use doping substances over time. The second aim was to explore the specific hypothesis that adolescents’ doping attitudes would predict the relationship between muscularity and thinness drives and doping intentions. To the best of our knowledge, there is no doping study that has examined these two objectives simultaneously within a single set of data.

It is important to point out that the existing literature has traditionally examined the drive for muscularity by assessing individuals’ endorsement of a variety of behaviors, including their declared use of doping substances (McCreary & Sasse, 2000). Since the present study posits a relationship between drive for muscularity and people’s doping attitudes and behavioral intentions, it focuses only on the attitude component, as opposed to the behavioral aspects, of the drive for muscularity, a choice that was made to minimize conceptual tautology and measurement redundancy in the study.

**Method**

**Participants and Procedure**

Participants included 1,022 adolescents students from 10 different Italian high schools evenly distributed across the regions of the country. The study was presented to participants as research on “sport practice, lifestyle, and beliefs about doping
substance use.” The schools provided their consent for participation. Each school randomly selected five classes for inclusion in the study (one for each high school year) and informed the students’ parents of the school’s participation in the research project. After collecting their personal consent, students completed questionnaires during class hours on two separate occasions, 4 months apart. The initial sample of 1,022 students included a balanced number of male and female students who, on average, were about 16 years of age ($SD = 1.5$). Of this sample, 864 students (nearly 86% of the initial sample) participated in the second assessment (mean age = 16.5 years, 51% female adolescents). The analyses of the present study relied exclusively on data from this latter longitudinal sample.

**Assessment and Instruments**

With regard to their demographic/descriptive characteristics, in addition to gender and age, participants provided data on their sport activities by indicating the number of weekly hours in which they engaged in sport activity, and whether or not they participated in sport competitions within the last 3 months. These data were utilized to examine the participants’ levels of sport involvement. Adolescents were assigned to a “non-athlete” group (45% of the total sample) if they reported no more than 2 hours of sport activity per week (i.e., at school), a “recreational athlete” group (22% of the total sample) if they reported more than 2 hours of sport activity per week but no participation in sport competitions, or a “competitive athlete” group (33% of the total sample) if they reported more than 2 hours of sport activity per week and participation in sport competitions within the last 3 months. Sport activity was not evenly distributed across adolescent boys and girls. While most of the competitive adolescent athletes were boys (71%), a large number of nonathletes and recreational athletes were girls (60% in both cases).

Participants provided data on their drive for muscularity by using the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). The DMS is a questionnaire designed to assess adolescent boys’ and girls’ attitudes about their muscularity and motivation to become more muscular. The original measure consists of 15 items and two subscales: a Muscularity-Oriented Body Image (MBI) subscale and a Muscularity Behavior (MB) subscale. The MBI reflects one’s attitudes and concerns toward the desire to gain muscle mass. The MB reflects the extent to which one engages in behaviors to bring about more muscle. As previously noted, the focus of the present study was on the attitudinal component of the drive for muscularity and, thus, analyses exclusively focused on the MBI scores. Reliability analysis indicated that the 7-item MBI subscale had very good internal consistency in the whole sample ($\alpha = 0.89$) and, separately, among adolescent boys ($\alpha = 0.91$) and girls ($\alpha = 0.86$).

Similarly, adolescents reported their drive for thinness on the Drive for Thinness Subscale (DTS), which is a 7-item subscale of the Eating Disorder Inventory-2 (EDI-2; Garner, 1991). Overall, the EDI-2 measures the pursuit of thinness and is often used in the study of eating disorders. On the DTS, participants responded to statements assessing excessive concern with dieting, preoccupation with weight, and the fear of gaining weight on a 6-point Likert scale ranging from 1 (never) to 6 (always). Examples of these items include, “I feel extremely guilty after overeating” and “I am preoccupied with the desire to be thinner.” A high score indicates a high level of drive for thinness. The DTS has adequate reliability and validity (Garner,
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1991), and its reliability in this study was quite good in the whole sample ($\alpha = 0.86$) and among the two gender groups ($\alpha = 0.79$ for boys and $\alpha = 0.85$ for girls).

To assess doping attitudes, participants’ used a 5-point semantic differential scale to express to what extent they viewed the “use of illegal substances to improve sport performance or physical appearance . . .” as useless/useful, foolish/wise, undesirable/desirable, negative/positive, harmful/beneficial, and advantageous/disadvantageous. The 6-item reliability for this doping attitude scale was satisfactory ($\alpha = 0.72$). Item scores were aggregated into a single score, for which higher values indicated more positive attitudes about doping.

Finally, at both assessment points, participants reported their prospective doping intentions on three items asking, respectively, “How strong is your intention to use illegal substances to improve your sport performance or your physical appearance?” “How likely is it that you will decide to use illegal substances to improve your sport performance or your physical appearance?” and “In the next 3 months, do you think you will decide to use illegal substances to improve your sport performance or your physical appearance?” Items were rated on a 5-point Likert scale ranging from 1 (not at all strong/likely) to 5 (very strong/likely). Item scores were averaged to obtain a single score, for which higher values indicated stronger intentions to use doping substances. In line with the guiding model of the study, the analyses exclusively focused on participants’ intentions as measured in the second assessment.

Statistical Analyses

Data analysis first focused on the descriptive statistics of the variables of interest, that is, the average scores in the whole sample, for drive for muscularity, drive for thinness, doping attitudes measured in the first assessment, and doping intentions measured in the second assessment. The study also focused on the concurrent and longitudinal relationships among the variables of interest in the total sample and across gender and sport involvement groups. Moreover, it included a series of structural equation modeling analyses (SEM) designed to examine the direction of influence across these variables. SEM is a technique permitting the estimation of the relationships among a set of “latent” or structural variables, that is, variables for which error in observed measurements has been controlled. This estimation is then utilized to reproduce the set of relationships among the observed variables, and SEM provides indices to evaluate the degree of fit between estimated and observed relationships. SEM also provides multiple-group analyses, allowing one to examine relationships among different groups simultaneously (e.g., gender groups). It is important to point out that, in any multiple-group SEM analysis, one has to ascertain that there is group invariance (i.e., equality) in measurement characteristics before estimating the “latent” relationships across groups. In other words, it is important to ensure that group differences among any hypothesized relationship are not due to systematic group differences in measurement characteristics.

Results

Table 1 shows the descriptive statistics of all the variables of interest for the total sample for adolescent boys and girls and for the three sport activity groups across the two gender groups.
Table 1  Descriptive Statistics for Adolescents’ Drive for Muscularity, Drive for Thinness, Doping Attitudes, and Assessment 2 Doping Use Intentions in the Whole Sample for Boys and Girls and for Levels of Sport Involvement

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sport Groups</th>
<th>Hours of sport Mean (SD)</th>
<th>Drive for Muscularity</th>
<th>Drive for Thinness</th>
<th>Attitudes toward Doping Use</th>
<th>Doping Intentions (Assessment 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>Nonathletes</td>
<td>1.40 (0.90)</td>
<td>2.66 (1.01)</td>
<td>2.03 (0.98)</td>
<td>1.85 (0.72)</td>
<td>1.47 (0.73)</td>
</tr>
<tr>
<td></td>
<td>Recreational</td>
<td>5.98 (2.51)</td>
<td>3.05 (1.20)</td>
<td>2.07 (1.02)</td>
<td>2.12 (0.81)</td>
<td>1.61 (0.91)</td>
</tr>
<tr>
<td></td>
<td>Competitive</td>
<td>7.94 (3.70)</td>
<td>2.71 (1.27)</td>
<td>2.01 (1.03)</td>
<td>1.96 (0.72)</td>
<td>1.58 (0.89)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5.24 (4.07)</td>
<td>2.75 (1.20)</td>
<td>2.03 (1.01)</td>
<td>1.95 (0.74)</td>
<td>1.54 (0.84)</td>
</tr>
<tr>
<td>Girls</td>
<td>Nonathletes</td>
<td>1.16 (0.99)</td>
<td>1.68 (0.81)</td>
<td>3.23 (1.39)</td>
<td>1.85 (0.75)</td>
<td>1.49 (0.84)</td>
</tr>
<tr>
<td></td>
<td>Recreational</td>
<td>5.67 (2.38)</td>
<td>1.89 (0.84)</td>
<td>3.49 (1.28)</td>
<td>1.90 (0.75)</td>
<td>1.43 (0.66)</td>
</tr>
<tr>
<td></td>
<td>Competitive</td>
<td>7.75 (3.71)</td>
<td>1.67 (0.89)</td>
<td>3.27 (1.35)</td>
<td>1.83 (0.79)</td>
<td>1.56 (0.84)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.61 (3.50)</td>
<td>1.73 (0.83)</td>
<td>3.30 (1.36)</td>
<td>1.86 (0.76)</td>
<td>1.49 (0.79)</td>
</tr>
<tr>
<td>Total</td>
<td>Nonathletes</td>
<td>1.26 (0.95)</td>
<td>2.08 (1.05)</td>
<td>2.75 (1.37)</td>
<td>1.85 (0.74)</td>
<td>1.48 (0.79)</td>
</tr>
<tr>
<td></td>
<td>Recreational</td>
<td>5.79 (2.43)</td>
<td>2.35 (1.48)</td>
<td>2.93 (1.37)</td>
<td>1.99 (0.78)</td>
<td>1.50 (0.77)</td>
</tr>
<tr>
<td></td>
<td>Competitive</td>
<td>7.89 (3.70)</td>
<td>2.41 (1.26)</td>
<td>2.37 (1.27)</td>
<td>1.92 (0.74)</td>
<td>1.58 (0.87)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.43 (3.88)</td>
<td>2.25 (1.15)</td>
<td>2.66 (1.35)</td>
<td>1.91 (0.75)</td>
<td>1.52 (0.82)</td>
</tr>
</tbody>
</table>
Overall, these statistics showed patterns that were in line with expectations. On average, adolescents did not report substantial drives for muscularity or for thinness, with mean scores of 2.25 and 2.66, respectively. Similarly, participants’ attitudes ($M = 1.91$) and prospective intentions ($M = 1.40$) toward doping indicated a substantial stand against doping use.

There also were group differences that emerged in analyses of variance simultaneously factoring gender and sport involvement. Adolescent boys reported significantly stronger attitudes and concerns for muscularity than did girls, whereas girls reported significantly greater concerns for thinness than did boys. In both cases, these differences were highly significant, respectively, $F(1, 853) = 187.45$ for muscularity, partial $\eta^2 = 0.18$; $F(1, 853) = 207.77$ for thinness, partial $\eta^2 = 0.20$. Adolescents’ concerns for muscularity also varied significantly with their level of sport involvement, with recreational and competitive athletes reporting a significantly stronger drive for muscularity than did adolescent non-athletes: $F(2, 853) = 5.47$, partial $\eta^2 = 0.02$. Finally, boys also reported significantly stronger and more positive attitudes toward doping use than did girls: $F(1, 853) = 3.9$, partial Eta Squared = 0.05. There were no other significant main or interaction effects.

There were significant correlations linking adolescents’ drives for muscularity, thinness concerns, and doping attitudes and intentions. Muscularity and thinness drives were negatively and significantly correlated in the total sample ($r = -0.09$). Even if this correlation is significant, this is probably due to sample size and suggests that the two drives were relatively independent. Adolescents’ gender modulated this relationship, however. Among boys, those who expressed a stronger drive for muscularity also expressed a stronger drive for thinness ($r = 0.22$). On the other hand, among girls, the two drives were virtually independent ($r = 0.09$). The two drives also were relatively independent for non-athletes and competitive athletes, whereas there was a small negative relation among recreational athletes ($r = -.15$). Additionally, among the total sample ($r = 0.20$), among the two gender groups (i.e., $r = 0.24$ for boys and $r = 0.15$ for girls), and among nonathletes, recreational, and competitive athletes (i.e., $r = 0.19$, $r = 0.22$, and $r = 0.20$, respectively), a stronger drive for muscularity was significantly related to more positive attitudes toward doping, whereas there was statistical independence between drive for thinness and doping attitudes among the total sample and within groups.

As for longitudinal relationships of the above variables with participants’ intentions to use doping substances in the future, participants’ greater drives for muscularity, as well as stronger drives for thinness, predicted stronger intentions to use doping substances (i.e., $r = 0.20$ and $r = 0.15$, respectively). These relationships were moderated by adolescents’ gender, in that the muscularity-intention relationship was more pronounced among boys (i.e., $r = 0.25$ vs. $r = 0.12$), whereas the thinness-doping intention relationship was more pronounced among girls (i.e., $r = 0.22$ vs. $r = 0.17$). There also was some variation in these predictive relationships across sport involvement groups. In particular, while the muscularity-intention relationship was slightly higher for recreational athletes than for the other groups ($r = 0.24$ vs. $r = 0.19$ for non-athletes and $r = 0.17$ for competitive athletes), the thinness-intention relationship was slightly higher for nonathletes than in the other groups ($r = 0.18$ vs. $r = 0.16$ for recreational athletes and $r = 0.14$ for competitive athletes). Finally, especially among boys (i.e., $r = 0.40$ vs. $r = 0.28$ for girls) and among recreational athletes (i.e., $r = 0.42$ vs. $r = 0.27$ for non-athletes and $r = 0.38$...
for competitive athletes), those who held more positive doping attitudes later on expressed stronger intentions to use doping substances.

Finally, we evaluated these relationships more formally by estimating the statistical value of a model in which differences in participants’ drives for muscularity and for thinness exerted longitudinal effects on adolescents’ intentions to use doping substances both directly and indirectly through intervening effects on doping attitudes.

These hypotheses are illustrated in Figure 1. This model of effects was evaluated by means of structural equation modeling software MPLUS (Muthén & Muthén, 1998). The analyses evaluated the extent to which the guiding model of effects would equally hold in boys and girls, and among adolescent nonathletes, recreational, and competitive athletes. All these analyses were multigroup. They first estimated parameters and fit indices with no invariance constraint across groups, then tested group invariance in the structural path coefficients, after verifying that there was group invariance in the measurement model (i.e., invariance in the measurement loadings and in variances or covariances).

As to the comparison of the model across gender, despite the fact that there were slightly different estimates for boys and girls, the magnitude of effects was statistically identical across groups, and the model of effects fit the data quite well: \( \chi^2 (344) = 720.44; \) CFI = 0.095, TLI = 0.095, RMSEA = 0.05, SRMR = 0.05. Participants who, early on, had stronger muscularity concerns (\( \beta = 0.14 \) for boys and \( \beta = 0.08 \) for girls) later expressed stronger intentions to use doping substances in the future. This predictive longitudinal effect also characterized participants who had stronger thinness concerns (\( \beta = 0.13 \) for boys and \( \beta = 0.16 \) for girls). Furthermore, among those who expressed muscularity concerns, a stronger endorsement concurrently predicted more positive doping attitudes (\( \beta = 0.35 \) for boys and \( \beta = 0.21 \) for girls). In turn, stronger doping attitudes longitudinally predicted doping intentions.

![Figure 1 — A model of the effects of drive for muscularity and drive for thinness on adolescents’ doping use intention through the endorsement of positive doping attitudes.](image-url)
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(β = 0.40 for boys and β = 0.38 for girls). In contrast, there was no significant effect of thinness concerns on doping attitudes for either boys or girls. Overall, these effects accounted for 26% and 20% of the variance in the doping intentions that boys and girls (respectively) reported during the second assessment.

Also for nonathletes, recreational athletes, and competitive athletes, the magnitude of effects was statistically identical across groups, and the model of effects fit the data well: χ² (544) = 1030.35; CFI = 0.095, TLI = 0.094, RMSEA = 0.06, SRMR = 0.08. Participants who during the first assessment had stronger muscularity or thinness concerns (β = 0.16 for both estimates), in the second assessment expressed stronger intentions to use doping substances in the future. Furthermore, among those who expressed muscularity or thinness concerns, a stronger endorsement concurrently predicted more positive doping attitudes (β = 0.29 for muscularity and β = 0.09 for thinness). In turn, stronger doping attitudes longitudinally predicted doping intentions (β = 0.40), thus partly mediating the effect of muscularity or thinness concerns. Overall, this model of effects accounted for 25% of the variance in participants’ doping intentions.

It is important to point out that in both SEM multigroup analyses, we hypothesized that participants’ doping intentions would partially mediate the effects that muscularity and thinness concerns would exert on participants’ doping attitudes. In order to formally evaluate this hypothesis, we again conducted the SEM multigroup analyses after setting to 0 (i.e., no effect) the path from doping attitudes to doping intentions. This procedure allows one to re-estimate the model’s coefficients and chi-square with one additional degree of freedom. If there was no mediation, both the models’ chi-squares and the magnitude of the direct effects of muscularity and thinness concerns on doping attitudes should not change in significant ways. On both accounts, however, the mediation hypothesis overall was supported. In both multigroup analyses, the model’s chi-square worsened significantly, and the direct effects of muscularity and thinness concerns on doping intentions increased, with more substantial increments for muscularity concerns across levels of participants’ sport involvement (from a β = 0.16 to β = 0.28) and among boys (from a β = 0.14 to β = 0.36), suggesting that a substantial portion of these effects were partially mediated by the acquisition of positive doping attitudes.

Discussion

The present study investigated whether adolescent boys and girls consider using doping substances to deal with personal concerns about body dissatisfaction. This position is not novel and can be traced back to at least two lines of research. One has focused on the drive for muscularity and on the cognitive and behavioral strategies characterizing individuals who excessively seek body perfection in terms of a fat-free, lean, well-shaped, and muscled body. The other has focused on the drive for thinness and on the cognitive and behavioral strategies characterizing individuals who experience excessive concerns with dieting, preoccupation with weight, and the fear of gaining weight.

In recent years, these lines of research have moved beyond gender-specific positions in which muscularity concerns would be relevant to only boys and thinness concerns relevant only to girls. Rather, they have conceived the excessive pursuits of
muscularity and of thinness in both genders as the possible antecedents or correlates of serious health behaviors among both groups, ranging from steroid use, to eating disorders, to other harmful weight-control behaviors (Labre, 2002; Ricciardelli & McCabe, 2004a). What emerges is that the pursuits of muscularity and of thinness may co-exist within individuals, whether they are male or female. What also seems clear is that doping use may represent not only a behavioral strategy for sport performance enhancement, but also a pathway to use a variety of illicit substances that adolescents may use for increasing muscle mass, for controlling body weight, or for reducing body fat. These possibilities stand as research hypotheses rather than as a consolidated body of knowledge, and the existing literature has recommended continued attention to theoretical integration and to stronger empirical designs to address these issues (Labre, 2002; Ricciardelli & McCabe, 2004a, 2004b).

The present study departed from these general considerations. It examined the pursuits of muscularity and of thinness in both adolescent boys and girls and evaluated the relative ways in which these two drives may longitudinally influence adolescents’ intentions to use doping substances in the future. As sport activity represents a behavioral context in which muscularity and thinness concerns might be resolved, the study also examined the guiding model across different levels of sport involvement. In addition, considering that doping use stands as a volitional and deliberate behavior that is influenced by the endorsement of positive doping attitudes, the present study also investigated whether the pursuit of muscularity and thinness would influence doping intentions by eliciting specific and more positive attitudes toward doping use.

On average, Italian adolescent boys and girls did not show substantial levels of muscularity or thinness concerns, although the former were significantly more pronounced in boys, and the latter were significantly stronger in girls. In addition, adolescents who reported some level of sport activity also manifested a greater drive for muscularity. Descriptively, these findings confirmed the patterns reported in the existing literature.

The examination of the relationships among muscularity and thinness concerns, and doping attitudes and doping intentions, simultaneously in both boys and girls and in adolescents with differing levels of sport involvement, also led to somewhat novel findings. Adolescent boys, but not girls, who had stronger muscularity concerns, also had stronger concerns about thinness. Also, among both boys and girls, stronger concerns about muscularity varied with more positive doping attitudes. Furthermore, also among both boys and girls, stronger muscularity or thinness concerns as well as stronger doping attitudes, predicted stronger intentions to use doping substances in the future. Finally, these bivariate relationships also held across different levels of sport involvement in that stronger muscularity or thinness concerns were related to more positive doping attitudes and stronger intentions to use regardless of level of sport involvement.

Thus, in line with existing literature, the descriptive findings overall confirmed that differences exist in the level of muscularity and thinness concerns, as well as in doping attitudes and intentions, which can be ascribed to either adolescents’ gender or to their level of involvement with sport activities. These correlational findings suggest that the processes possibly linking muscularity or thinness concerns with doping attitudes and later intentions might be similar across gender and sport involvement groups. Structural equation modeling analyses supported this possibil-
ity. Regardless of gender or level of sport involvement, adolescents’ muscularity and thinness concerns directly influenced the intention to use doping substances in the future. In addition, regardless of gender and level of sport involvement, muscularity concerns also influenced adolescents’ intentions indirectly through the intervening effect of the endorsement of positive doping attitudes. In all groups, a more positive endorsement of doping attitudes in turn exerted a strong effect over time on adolescents’ intentions to use doping substances in the future. Interestingly, this path did not hold for adolescents’ thinness concerns in that among both boys and girls, thinness only directly influenced later doping intentions. Possible explanations of this finding are discussed at a later point.

Together, the findings of the present study solicit several concluding considerations. First, the drives for muscularity and thinness seem to co-exist, though the nature of the relationship between the two drives appears to differ according to a variety of factors. For example, the two drives are significantly and negatively correlated across the total sample, yet they are significantly and positively correlated among boys and not correlated among girls. We believe these findings plausibly suggest that the relationship between muscularity and thinness acquires a different meaning depending upon individuals’ goals with respect to physical appearance and the ways these goals are served by involvement in sport activity. For instance, an adolescent may have the primary goal of being or becoming fit, which also may mean seeking to lose body fat and to gain muscle mass. In this case, concerns about both muscularity and thinness would be positively correlated. Yet, in another adolescent who practices sport at some level with the exclusive goal of losing weight, a strong concern about being thin could be related to a weak concern about gaining muscle mass, thereby yielding a negative relationship between muscularity and thinness.

These two examples offer a general view in which concerns about muscularity and thinness may characterize adolescent boys and girls and contribute to their self-regulatory and behavioral functioning according to personal needs, priorities, and life demands. In this view, gender and level of sport activity may moderate, rather than determine, observed patterns. For instance, the finding that muscularity and thinness concerns were positively related among boys and unrelated among girls might be an indication of the normative influence of socio-cultural gender-based body ideals (Field et al., 2001; Ricciardelli & McCabe, 2004a). That is, among boys, both muscularity and thinness concerns might be “needed” to comply with a body ideal stressing a muscular and lean body. Yet among girls, a link between muscularity and thinness would not conform to a specific normative or socio-cultural model of the female body type.

Another finding of this study was that both muscularity and thinness concerns directly influenced boys’ and girls’ intentions to use doping substances in the future. Furthermore, among both genders, drive for muscularity exerted its influence through the endorsement of positive doping attitudes, whereas drive for thinness did not. Albeit only speculatively, these findings may offer support for the general view that doping use among adolescents represents a behavioral strategy to address personal body dissatisfaction. For those adolescents who are excessively concerned with muscularity, doping use may appear to facilitate conformity with normative or socially well-established body ideals. For those concerned with thinness, however, doping use may simply represent one of several behavioral strategies to resolve body dissatisfaction and achieve thinness. As such, adolescents may choose to use
doping substances without necessarily acquiring or forming specific attitudes or views about doping.

The above possibilities would require the examination of the knowledge and use of specific doping substances that adolescents with differing concerns may consider. The present study could not provide this level of analysis. More in general, it is, however, important to point out that the study has some clear limitations. First and foremost, the correlational findings overall evidenced relatively small effects among the variables of interest that reached statistical significance as a result of a relatively large sample size. This seems particularly true for the relationship between the drives of muscularity and thinness and, in general, for the average correlations in the overall sample of adolescents. When correlations were disaggregated across groups (e.g., gender, level of sport involvement), however, the findings seem to be more informative in pointing out possible group differences in patterns of relationships. An additional limitation concerns the possibility of generalizing the study’s findings. The study only focused on Italian adolescents and raises the possibility that cultural factors may influence adolescents’ body concerns and doping attitudes. Thus, any generalization should be undertaken with caution at this time. Finally, it is also implicit in our comments above, that the need of studying the different ways in which adolescents may consider the use of specific doping substances underlies a limitation of the current study.

**Conclusion**

The present study departed from the assumption that doping use may not only satisfy goals of performance improvement but also individuals’ body dissatisfaction or concerns. In line with this general interest, and with existing literature suggesting that doping use is regulated by social-cognitive processes, the study focused on an initial hypothesis, that is, whether muscularity and thinness concerns would longitudinally influence adolescents’ prospective intentions to use doping substances through the intervening acquisition of positive doping attitudes. As a novelty, this hypothesis was simultaneously examined in boys and girls and across different levels of sport involvement. The findings of the study overall confirmed the key tenets of this general hypothesis. Nonetheless, it is also important to point out that there were clear limitations in the study, in that its findings could not be generalized to adolescents from different cultural backgrounds and the guiding model did not address at all the important question of which specific doping substances may stand as the behavioral outcome of the modeled effects of muscularity and thinness concerns.

**References**


