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# The effects of social relationships and acceptance on disturbed eating attitudes in elite adolescent female athletes: The mediating role of physical self-perceptions

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## ► To cite this version:

Stéphanie Scoffier-Mériaux, Christophe Maiano, Fabienne d'Arripe-Longueville. The effects of social relationships and acceptance on disturbed eating attitudes in elite adolescent female athletes: The mediating role of physical self-perceptions. *International Journal of Eating Disorders*, 2010, 10.1002/eat.20597 . hal-02524757

**HAL Id: hal-02524757**

**<https://hal.univ-cotedazur.fr/hal-02524757v1>**

Submitted on 3 Apr 2020

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**The effects of Social Relationships and Acceptance on Disturbed Eating Attitudes in Elite Adolescent Female Athletes: the Mediating Role of Physical Self-perceptions**

Journal:	<i>International Journal of Eating Disorders</i>
Manuscript ID:	IJED-08-0103.R1
Wiley - Manuscript type:	Regular Article
Date Submitted by the Author:	n/a
Complete List of Authors:	SCOFFIER, Stéphanie; Université de Nice Sophia-Antipolis MAIANO, Christophe; Université Aix-Marseille II, UMR 6233 "Institute Movement Sciences" D'ARRIPE-LONGUEVILLE, Fabienne; Université de Nice Sophia-Antipolis
Keywords:	structural equation modeling, aesthetic sports, significant others, friendship, physical self-perceptions



1 Running head: FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETES

2

3 The effects of Social Relationships and Acceptance on Disturbed Eating Attitudes in Elite

4 Adolescent Female Athletes: the Mediating Role of Physical Self-perceptions

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22

23 Acknowledgments

24 This study was financially supported by a grant from the University of Nice Sophia-  
25 Antipolis. The authors are grateful to the children and adolescents for their participation. They  
26 also sincerely thank Magaly Hars for her assistance in the collection and analysis of the data,  
27 Paul Fontayne for his assistance on the methodology of the structural analysis and Catherine  
28 Carmeni and Shahida Mounier for their help in the English translation.

29 Revision submitted: august, 2008

1 Running head: FACTORS OF DISTURBED EATING ATTITUDES IN ELITE  
2 ATHLETES

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14 The effects of Social Relationships and Acceptance on Disturbed Eating Attitudes  
15 in Elite Adolescent Female Athletes: the Mediating Role of Physical Self-perceptions

For Review Only

## FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE

## 1 Abstract

2 Objective: The purpose of the study was to examine the effects of social  
3 relationships (i.e., coach, friends, and parents) and acceptance (i.e., peers) on  
4 Disturbed Eating Attitudes (DEA) in elite adolescent female athletes, through the  
5 mediating role of physical self-perception (i.e., perceived physical appearance and  
6 perceived physical ability).

7 Method: The sample comprised 227 elite adolescent female athletes ( $M_{age} =$   
8  $15.75$ ;  $SD_{age} = 3.00$ ) engaged in various aesthetic sports. The data was analyzed using  
9 structural equation modeling method and mediation analysis.

10 Results: They showed that peer acceptance and quality of parent-athlete  
11 relationships have a significant negative influence on DEA in elite adolescent female  
12 athletes. Moreover, the quality of relationship with the coach and sport friend has a  
13 significant positive influence on DEA in female athletes through the mediating role of  
14 perceived physical ability.

15 Conclusion: The quality of relationship with parents and peer acceptance  
16 would be a protective factor regarding DEA, whereas the quality of relationships with  
17 coach and friend in sport would be risk factors for the development of DEA in  
18 adolescent female athletes through the mediating role of perceived physical ability.  
19 Recommendations for future use of, and research on, activities are outlined.

20

21 Keywords: structural equation modeling, aesthetic sports, significant others,  
22 friendship, physical self-perceptions.



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1 perception of athletes has been undertaken. Because the Shroff and Thompson<sup>9</sup>  
2 tripartite model was established in daily living situations, it is not necessarily applicable  
3 to another context such as elite sport. Firstly, athlete social environment is different  
4 from adolescent social context in daily life. Several studies demonstrated that the coach  
5 was often the key person in the lives of athletes, and that he/she could be a risk factor  
6 for the development of eating disorders because of strong pressures to keep body weight  
7 low<sup>11</sup> or because of the impact of his/her coaching style.<sup>12</sup> Moreover, Duda's<sup>13</sup> study  
8 revealed that high importance placed on performance excellence and pressure regarding  
9 body weight within the family have an influence on adolescent physical self-perception.  
10 Peers also play a unique and important role in shaping the quality and meaning of  
11 athletes' sport experience.<sup>14</sup> Specifically, peer acceptance and friendship quality have  
12 been found to predict perceived competence.<sup>15</sup> However no research to date has  
13 simultaneously examined the influence of peer acceptance and friendship quality on  
14 athlete eating disorders.

15 Secondly, athletes are under high pressure from the sport achievement context  
16 itself. They have to conform to an ideal body weight in order to achieve an aesthetically  
17 pleasing appearance and a performance excellence, both of which may be essential to  
18 success.<sup>11, 12, 16</sup> In sport contexts, physical self-perception thus not only includes  
19 perceived physical appearance but also perceived physical ability.<sup>15</sup> This latter variable  
20 is recognized as being predictive of many adaptive patterns including positive affects,  
21 persistence and performance.<sup>11</sup> However the existing literature<sup>11</sup> has essentially focused  
22 on self-perception measures such as perceived physical appearance, body image and  
23 body satisfaction, and has not yet explored the relationship between perceived physical  
24 ability and DEA. Finally, one can assume that the influence of media on eating  
25 disorders is different for athletes and non-athletes. While the role of media images and

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1 messages in<sup>7</sup> socio-cultural internalization of appearance has been reported in  
2 adolescent girls, sport hero influence may be more salient in adolescent athletes.<sup>18</sup>

3 In summary, the particularity of the athlete's social environment (e.g., the  
4 salience of the coach's influence) and engagement in achievement contexts for the  
5 purpose of demonstrating competence (e.g., the salience of perceived physical ability)  
6 support the value of conducting context-specific examination of the psychosocial factors  
7 of eating disorders among athletes. The aim of this study was thus to examine the  
8 influence of social relationship quality (i.e., with friends, parents and coach) and  
9 acceptance (by peers) on the development of DEA through the mediating role of  
10 physical self-perception (i.e., perceived physical appearance and perceived physical  
11 ability). Based on the model of Shroff and Thompson<sup>9</sup> and the aforementioned sport  
12 psychology literature, a hypothetical model was constructed to assess the power of  
13 interpersonal relationship quality (i.e., coach, friends, peers and parents) to predict  
14 DEA, via perceptions of physical appearance and physical ability. The first hypothesis  
15 supposed that, within the context of elite sport, the quality of the relationships with  
16 coach, friend and parents and peer acceptance would be positively linked with physical  
17 self-perception.<sup>13</sup> The second hypothesis expected that physical self-perception (i.e.,  
18 physical appearance and physical ability) would be negatively linked to DEA.<sup>11</sup> Finally,  
19 the third hypothesis also expected to observe direct and indirect (i.e., through physical  
20 self perceptions) negative influences of the different measures of social relationship on  
21 DEA.<sup>8</sup>

## 22 Method

### 23 *Participants and Procedure*

24 The sample was composed of 227 voluntary French adolescents ( $M_{\text{age}} = 15.75$ ;  
25  $SD = 3.00$ ) recruited from elite sport structures and which exclusively practiced an  
26 aesthetic sport. This population of athletes engaged in aesthetic sports was recruited for



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1 their particular vulnerability to the development of DEA<sup>12, 11</sup> The sports taken into  
2 consideration were dance ( $N_D = 22$ ), artistic gymnastics ( $N_{AG} = 49$ ), rhythmic  
3 gymnastics ( $N_{RG} = 47$ ), figure-skating ( $N_{FS} = 48$ ), and synchronized swimming ( $N_{SS} =$   
4 61). All of the participants had an average of six to ten years of either national or  
5 international experience ( $M = 8.78$ ;  $SD = 1.12$ ) at senior or junior level. They practiced  
6 between 12 to 18 hours of physical training per week ( $M = 13.86$ ;  $SD = 2.85$ ).

7         Consent was obtained from national federations, departmental leagues and  
8 committees, coaches, athletes, and the parents of minors prior to performing the study.  
9 The questionnaires were completed either at the beginning or the end of training  
10 sessions, depending on the athlete's availability. Questionnaire completion was carried  
11 out under standardized conditions (i.e., isolation, paper, pencil, and prohibition to  
12 communicate) and did not exceed more than 20 minutes.

### 13 *Measures*

14         *Sport friendship quality.* Sport friendship quality was measured using the French  
15 version of the Weiss and Smith<sup>19</sup> *Sport Friendship Quality Scale* (SFQS)<sup>20</sup> This scale  
16 includes 22 items assessing five positive and one negative relationship dimensions.  
17 Participants answered each item using a six-point Likert-type scale ranging from “not at  
18 all true” (1) to “really true” (6). In accordance with previous studies,<sup>15, 21</sup> a global index  
19 of positive friendship quality was obtained by averaging the responses to items from the  
20 five positive dimensions. This scale provided an acceptable internal consistency  
21 coefficient ( $\alpha = .84$ ).

22         *Coach relationship quality.* The quality of the athlete's relationship with the  
23 coach was assessed using a modified version of the SFQS French version. In this  
24 adaptation, the word “friend” was changed to “coach”. A similar adaptation was made  
25 by Ullrich-French and Smith<sup>15</sup> for other social agents such as parents. A Confirmatory  
26 Factor Analysis (CFA) provided support for a six-factor model<sup>[1]</sup>. Responses to items

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1 from positive dimensions were averaged to produce the coach relationship quality score.  
2 This global scale exhibited good internal consistency ( $\alpha = .92$ ).

3 *Disturbed eating attitudes.* Eating attitudes and behaviors linked to DEA were  
4 measured with the French version of the Garner, Olmsted, Bohr and Garfinkel<sup>4</sup> EAT.<sup>22</sup>  
5 This 26-item self-report inventory comprises three subscales: dieting, bulimia and oral  
6 control. For the purpose of this study and consistently with previous studies,<sup>1</sup> only a  
7 global index measuring disturbed attitudes was used. This global scale exhibited  
8 satisfactory internal consistency ( $\alpha = .87$ ).

9 Several subscales from the French version of the Marsh (1990) *Self-Description*  
10 *Questionnaire* (SDQ-II)<sup>17, 23</sup> were used: (a) *perceived peer acceptance* was measured  
11 through a 10-item subscale which exhibited a satisfactory internal consistency  
12 coefficient ( $\alpha = .84$ ); (b) *Parent relationship quality* was measured through an 8-item  
13 subscale and presented good internal consistency ( $\alpha = .82$ ); (c) *Perceived physical*  
14 *ability* was adapted to each sport. This subscale was composed of eight items and  
15 exhibited good internal consistency ( $\alpha = .87$ ); (d) *Perceived physical appearance* was  
16 measured through an 8-item subscale and showed satisfactory internal consistency ( $\alpha =$   
17  $.78$ ).

### 18 *Data Analyses*

19 The construct validity of the model was examined through CFA. Given the  
20 number of participants and to maintain an acceptable degree of freedom, the number of  
21 indicators per latent variable was reduced. To this end and according to Bagozzi &  
22 Heatherton<sup>24</sup> recommendations, several item parcels were developed using random  
23 splitting of averaged items. The CFA was thus based on 27 observed variables and  
24 seven latent factors. Analyses were performed using bootstrapped maximum likelihood  
25 estimation with the AMOS 7.0 program<sup>25</sup> because of the significant multivariate non-  
26 normality of the data (normalized skewness and kurtosis: 91.21 and 17.55). Assessment

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1 of model fit was based on multiple indicators recommended by the Comparative Fit  
2 Index (CFI), the Tucker-Lewis Index (TLI Byrne<sup>26</sup>, Hu and Bentler<sup>27</sup>, and Vandenberg  
3 and Lance<sup>28</sup>: chi square ( $\chi^2$ ), the Root Mean Square Error of Approximation  
4 (RMSEA), and RMSEA 90 Confidence Interval (RMSEA 90% CI). Scale reliability ( $\rho$ )  
5 was computed from the model's standardized parameter estimates, using the formula:  $\rho$   
6 =  $(\sum \lambda_i)^2 / ([\sum \lambda_i]^2 + \sum \delta_{ii})$ , where  $\lambda_i$  are the factor loadings and  $\delta_{ii}$  the error variances.<sup>29</sup>

7 The hypothesis model assessing the power of interpersonal relationship quality  
8 (i.e., coach, friends, peers and parents) to predict DEA via perceptions of physical  
9 appearance and physical ability, was examined through a series of Structural Equation  
10 Modeling (SEM). The mediation effects were tested using the four steps suggested by  
11 Baron and Kenny<sup>29</sup>. According to these authors, mediation exists if the influence of the  
12 independent variables on the dependent variables is significant via the mediators. If the  
13 direct effect imposed at the second step was different from zero, a complete mediation  
14 was considered.<sup>30</sup> Finally, the individual parameters of the model such as the error  
15 measurement; inter-item correlations and modifications index were examined to  
16 evaluate the conformity of the model to the data.

## 17 Results

### 18 *Preliminary Analyses*

19 Multivariate Analyses of Variance (MANOVAs) were performed on all  
20 observed variables, in order to examine the differences due to adolescent sport type. The  
21 first analysis of the variables relating to social relationships indicated a significant main  
22 effect of sport type (Wilks'  $\lambda = .70$ ,  $F_{(16, 685)} = 5.22$ ,  $p < .0001$ ,  $\eta^2 = .30$ ). Univariate  
23 analyses of Variance (ANOVA) and subsequent post-hoc tests revealed that dancers  
24 reported significantly lower scores compared with the other participants on: (a) sport  
25 friendship quality ( $M_D = 4.90$ ;  $M_{RG} = 5.20$ ;  $M_{AG} = 5.23$ ) and (b) coach relationship  
26 quality ( $M_D = 3.30$ ;  $M_{RG} = 3.97$ ;  $M_{AG} = 4.21$ ;  $M_{RG} = 5.20$ ;  $M_{FS} = 4.03$ ). A second

## FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 7

1 MANOVA was performed on the other variables (i.e., perceived physical appearance,  
2 perceived sport ability and disturbed eating attitudes). This analysis yielded a main sport  
3 effect (Wilks  $\lambda = .85$ ,  $F_{(12, 596)} = 2.99$ ,  $p < .001$ ;  $\eta^2 = .15$ ). Univariate ANOVA and  
4 subsequent post-hoc tests showed that dancers reported significantly lower scores of  
5 perceived physical ability compared with the other participants ( $M_D = 4.85$ ;  $M_{GR} = 5.30$ ;  
6  $M_{NA} = 5.35$ ) and higher scores of DEA ( $M_D = 2.90$ ;  $M_{GR} = 2.46$ ;  $M_{NA} = 2.39$ ). The other  
7 variables did not differ according to sport type. In order to ensure a homogeneous  
8 population, the 22 dancers were thus excluded from all subsequent analyses.

9 *Construct validity analysis of the tested model.* The CFA illustrated in Figure 1,  
10 indicated that the hypothetical model was acceptable ( $\chi^2 = 342.87$ ;  $N = 205$ ;  $ddl = 303$ ,  
11  $p < .01$ ; CFI = .92; TLI = .91; RMSEA = .068; RMSEA 90% CI = .060-.077). Moreover,  
12 Figure 1 exhibited that: (a) all loadings and uniquenesses were significant; (b)  
13 composite scale reliability was acceptable in most cases; and (c) most of the latent  
14 correlation scores were significant.

15 *Partial mediation model.* The partial mediation model, which established  
16 relationships between the independent variables (i.e., social relationship quality) and the  
17 dependent variable (i.e., DEA) both directly and via the mediators (i.e., physical self-  
18 perceptions), was retained because it was the most complete and parsimonious model  
19 concerning the causal paths explored in the study. This model provided acceptable  
20 goodness-of-fit indices ( $\chi^2 = 342.77$ ;  $N = 205$ ;  $ddl = 303$ ,  $p < .01$ ; CFI = .92; TLI = .91;  
21 RMSEA = .068; RMSEA 90% CI = .060-.077) and exhibited: (a) a negative influence of  
22 parent relationship quality ( $\beta = -.18$ ,  $p < .05$ ) and perceived peer acceptance ( $\beta = -.15$ ,  $p$   
23  $< .05$ ) on DEA; (b) a positive influence of both sport friendship quality ( $\beta = .24$ ,  $p$   
24  $< .05$ ) and coach relationship quality ( $\beta = .31$ ,  $p < .05$ ) on perceived physical ability and  
25 (c) a positive influence of physical self ability on DEA ( $\beta = .27$ ,  $p < .05$ ). The partial

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1 mediation model provided in Figure 2 also indicated that the perceived physical  
2 appearance was not significantly related to the other studied variable. This hypothetical  
3 model explained 84.7% of the variance in perceived physical ability, 68.8% of the  
4 variance in perceived physical appearance and 66% of the variance in DEA. Other  
5 models were also examined according to Barron and Kenny<sup>29</sup> procedures: (a) direct  
6 effects of the independent variables on the dependent variable; (b) direct effects of the  
7 mediators on the independent variables; and (c) complete mediation. However, although  
8 these models exhibited acceptable goodness-of-fit indices in all cases, they were less  
9 adapted to the data than the partial mediational model <sup>[2]</sup>.

#### 10 Discussion

11 The present study examined the influence of social relationship (i.e., with friend,  
12 parents and coach) and acceptance (i.e., with peers) on the development of DEA in elite  
13 adolescent female athletes in sports with a strong aesthetic component, through the  
14 mediating role of physical self-perception (i.e., perceived physical appearance and  
15 perceived physical ability). Results from this study revealed that a high quality of  
16 parent-child relationship plays a protecting role regarding DEA in elite adolescent  
17 female athletes. Moreover, in agreement with our hypothesis, peer acceptance  
18 negatively influenced DEA. These results suggest thus that the data regarding the  
19 general population of adolescents can be generalized to adolescent females in high-level  
20 sport.<sup>8</sup> They also constitute an original contribution to the literature, because the role of  
21 peer acceptance has never yet been reported in elite adolescent female athletes.

22 In the existing sport psychology literature the coach's influence on eating  
23 disorders has been exclusively considered in terms of perceived motivational climate  
24 and coaching style.<sup>12, 11</sup> The present study found that the quality of the coach-athlete  
25 relationship was not a direct predictor of DEA. The quality of this relationship, such as  
26 sport friendship quality, positively and significantly influenced DEA through perceived

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1 physical ability. Consistent with Ullrich-French and Smith<sup>15</sup> findings, perceptions of  
2 relationship with the coach and of friendship quality positively influenced perceived  
3 physical ability. Perceived physical ability, on the other hand, appeared to be positively  
4 associated with DEA. This relationship differed from the data of earlier studies showing  
5 that perceived physical ability was generally associated with patterns of adaptive  
6 accomplishment.<sup>15</sup> It differed also from the findings that positive body image and body  
7 satisfaction were protective factors regarding DEA, in both daily living situations and  
8 sport setting.<sup>1</sup> However, no significant relationship between perceived physical  
9 appearance and DEA was observed in the present study, in contrast to the findings of  
10 earlier works.<sup>31</sup> These discrepancies indicate the need to differentiate the variables of  
11 perceived physical appearance, body image, and body satisfaction and the concept of  
12 perceived physical ability in sport. It could be hypothesized that the primacy of  
13 excellence in performance in high-level sport and thus the purpose of demonstrating  
14 competence in such achievement contexts may account for these differences.

15 Several limitations of the current series of studies must be taken into account  
16 when interpreting these findings. First, the data was mostly self-reported and thus may  
17 have been biased by social desirability. Then, this study was cross-sectional, which  
18 limits the stability across time of the relationships between variables. Moreover, this  
19 study was only performed with a girl sub sample, whose constituents practiced aesthetic  
20 sport at elite level, and thus the results observed can't be generalized to a boy sub  
21 sample or to other athletes. Finally, the sporting hero influence was not considered in  
22 our tested model. These results suggest several directions for future research. To better  
23 understand the paradoxical status of interpersonal relationship quality in high-level  
24 sport, other variables from the model of Shroff and Thompson<sup>9</sup>, such as internalized  
25 norms and mechanisms of social comparison, could be examined. Moreover, along with  
26 the media influence in the original model of Shroff and Thompson, it could be of

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1 interest to examine the influence of the sporting hero. This would require developing  
2 and validating an appropriate measure to assess athlete perceptions regarding the body  
3 ideal of sporting heroes. Furthermore the Thompson, Coover, & Storer<sup>5</sup> model  
4 indicated the interest in also examining the reciprocal relationships between DEA and  
5 self-perception, and between DEA and social relationship variables.

6 In conclusion, the present study showed that the quality of the parent-athlete  
7 relationship and peer acceptance would be protective factors regarding DEA in elite  
8 adolescent female athletes. It also revealed that both the quality of the coach-athlete and  
9 sport friendship relationships positively and significantly influenced DEA through the  
10 mediating role of perceived physical ability. These paradoxical findings suggest that  
11 both of these social relationship variables may be indirect risk factors for the  
12 development of DEA in elite female adolescent athletes. The relationship between  
13 social influences and DEA in high achievement contexts such as elite aesthetic sports,  
14 and the specific role of physical self-perception should thus merit further attention in  
15 future research. A better understanding of these mechanisms would clearly help to  
16 refine the current strategies to prevent DEA in elite adolescent female athletes and  
17 would benefit training programs for sport and health psychology (i.e., mental  
18 preparation techniques and health maintenance).

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1 Footnotes

2 <sup>[1, 2]</sup> Complete results from these analyses are available upon request from the first  
3 author.

4

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6

7

## FIGURES

8 Figure 1. Confirmatory factor analysis model: Standardized loadings, uniquenesses,  
9 composite reliability coefficients and interlatent correlations of the tested model.

10

11 *Notes:* The standardized coefficients of estimation and the uniquenesses were all  
12 significant at  $p < .01$ .  $\rho$ : composite scale reliability; \*: significant scores of correlation at  
13  $p < .05$ .

14 Figure 2. Structural equation modeling of the psychosocial, which explained the  
15 disturbed eating attitudes in elite female athletes.

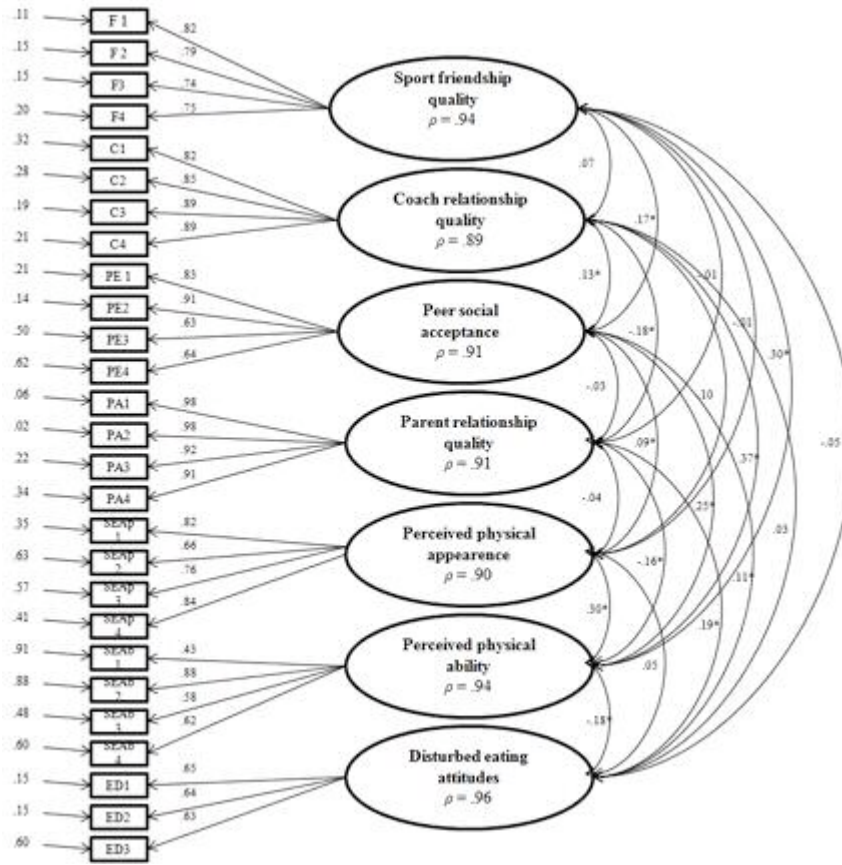
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17 *Notes:*  $R^2$ : percentage of explained variance; \*: significant standardized estimate  
18 coefficients at  $p < .05$ . Standardized direct effect estimate coefficients are in  
19 parentheses.

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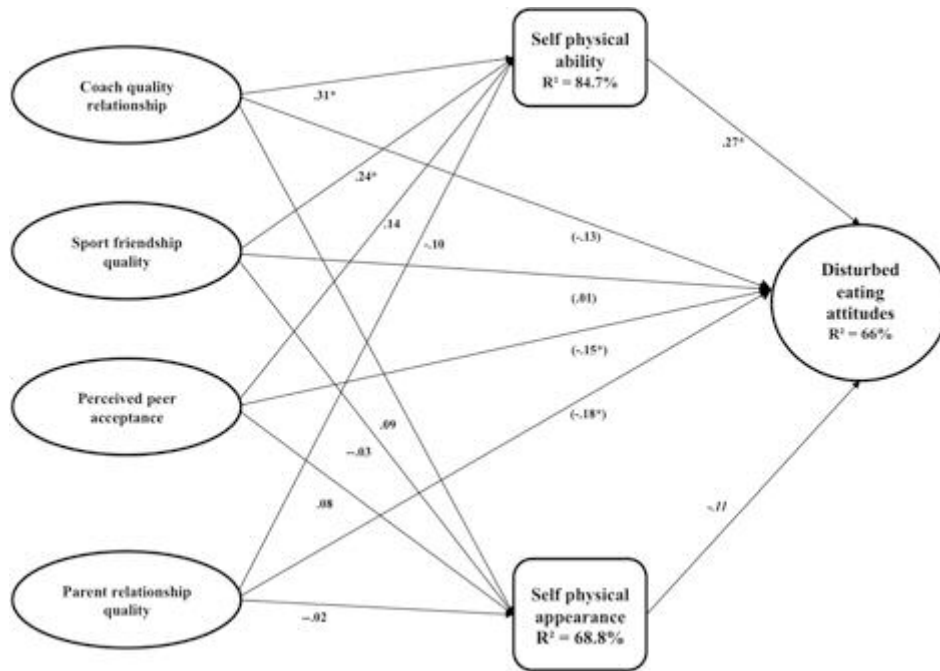
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