



HAL
open science

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

Stéphanie Scoffier-Mériaux, Christophe Maiano, Fabienne
d'Arripe-Longueville

► 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-02524757>

Submitted on 3 Apr 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



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

5

6 Stéphanie Scoffier 10 Christophe Maïano

7 Université de Nice Sophia 11 UMR 6233 /CNRS « Institute

8 Antipolis, France 12 Movement Sciences », Université Aix-

9 13 Marseille II Marseille, France

14 Fabienne d'Arripe-Longueville

15 Université de Nice Sophia Antipolis

16 France

17

18 Correspondent author: Stéphanie Scoffier

19 UFR STAPS – Université de Nice Sophia-Antipolis

20 261 Route de Grenoble, BP 3259, 06205 Nice cedex 03 – France

21 Phone: ++ 33 4 92 29 65 29, Fax: ++ 33 4 92 29 65 37, E-mail: scoffier@unice.fr

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

3

4

5

6

7

8

9

10

11

12

13

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

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.

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 2

1 perception of athletes has been undertaken. Because the Shroff and Thompson⁹
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 low¹¹ or because of the impact of his/her coaching style.¹² Moreover, Duda's¹³ 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.¹⁴ Specifically, peer acceptance and friendship quality have
12 been found to predict perceived competence.¹⁵ 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.^{11, 12, 16} In sport contexts, physical self-perception thus not only includes
19 perceived physical appearance but also perceived physical ability.¹⁵ This latter variable
20 is recognized as being predictive of many adaptive patterns including positive affects,
21 persistence and performance.¹¹ However the existing literature¹¹ 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

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 3

1 messages in⁷ socio-cultural internalization of appearance has been reported in
2 adolescent girls, sport hero influence may be more salient in adolescent athletes.¹⁸

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 Thompson⁹ 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.¹³ The second hypothesis expected that physical self-perception (i.e.,
18 physical appearance and physical ability) would be negatively linked to DEA.¹¹ 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.⁸

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

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 4

1 their particular vulnerability to the development of DEA^{12, 11} 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 Smith¹⁹ *Sport Friendship Quality Scale* (SFQS)²⁰ 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,^{15, 21} 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 Smith¹⁵ for other social agents such as parents. A Confirmatory
26 Factor Analysis (CFA) provided support for a six-factor model^[1]. Responses to items

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 5

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 Garfinkel⁴ EAT.²²
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,¹ 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)^{17, 23} 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 Heatherton²⁴ 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 program²⁵ because of the significant multivariate non-
26 normality of the data (normalized skewness and kurtosis: 91.21 and 17.55). Assessment

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 6

1 of model fit was based on multiple indicators recommended by the Comparative Fit
2 Index (CFI), the Tucker-Lewis Index (TLI Byrne²⁶, Hu and Bentler²⁷, and Vandenberg
3 and Lance²⁸: chi square (χ^2), the Root Mean Square Error of Approximation
4 (RMSEA), and RMSEA 90 Confidence Interval (RMSEA 90% CI). Scale reliability (ρ)
5 was computed from the model's standardized parameter estimates, using the formula: ρ
6 = $(\sum \lambda_i)^2 / ([\sum \lambda_i]^2 + \sum \delta_{ii})$, where λ_i are the factor loadings and δ_{ii} the error variances.²⁹

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 Kenny²⁹. 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.³⁰ 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

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 8

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 Kenny²⁹ 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 ^[2].

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.⁸ 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.^{12, 11} 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

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 9

1 physical ability. Consistent with Ullrich-French and Smith¹⁵ 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.¹⁵ 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.¹ 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.³¹ 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 Thompson⁹, 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

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 10

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, & Storer⁵ 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).

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 11

1 **References**

- 2 01. Petri TA, Greenleaf, CA. Eating disorders in sport: From theory to research to
3 intervention. In Tenenbaum G, editors. Handbook of Sport Psychology, (3rd ed.).
4 Wiley & Sons, Inc, Hoboken, New Jersey 2007, pp. 352-378. J.
- 5 02. Hobart, J.A. and Smucker, D.R. The female athlete triad. Am Fam Physician 2000;
6 61: 3357-3367.
- 7 03. Garner DM, Garfinkel PE. The Eating Attitudes Test: An index of the symptoms of
8 anorexia nervosa. Psychol Med 1979; 9: 273-279.
- 9 04. Garner D, Olmsted M, Bohr Y, Garfinkel P. The Eating Attitude Test: psychometric
10 features and clinical correlates. Psychol Med 1982; 12 : 871-878.
- 11 05. Jacobi C, Hayward C, de Zwaan M, Kraemer HC Agras S. Coming to terms with
12 risk factors for eating disorders : application of risk terminology and suggestions
13 for a general taxonomy. *Psychol Bull* 2004; 130, 19-65.
- 14 06. Thompson JK, Coovert MD, Stormer S. Body image, social comparison and eating
15 disturbance: a covariance structure modelling investigation. International J Eat
16 Dis 1999; 26: 43–53.
- 17 07. Kerry H, Van den Berg, Thompson JK. A test of the tripartite influence model of
18 body image and eating disturbance in adolescent girls. *Body Image* 2004; 1: 237-
19 251.
- 20 08. Gerner B, Wilson P. The relationship between friendship factors and adolescent
21 girls' body image concern, body dissatisfaction, and restrained eating. *Int J Eat*
22 Dis 2005; 37: 313-320.
- 23 09. Shroff H, Thompson JK. The tripartite influence model of body image and eating
24 disturbance: A replication with adolescent girls. *Body Image* 2006; 3: 17-23.

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 12

- 1 10. van den Berg, P., Thompson, J. K., Brandon, K., & Covert, M. (2002). The
2 Tripartite Influence model of body image and eating disturbance: A covariance
3 structure modeling investigation testing the mediational role of appearance
4 comparison. *Journal of Psychosomatic Research*, 53, 1007-1020.
- 5 11. Sundgot-Borgen J. Risk and trigger factors for the development of eating disorders
6 in female elite athletes. *Med Sci Sports Exerc* 1994; 26: 414-419.
- 7 12. Biensecker A, Martz D. Impact of coaching style on vulnerability for eating
8 disorder: An analog study. *Eat Disord* 1999; 7: 235-244.
- 9 13. Duda J. La théorie des buts d'accomplissement et la santé dans le domaine physique
10 [Achievement goal theory and health in physical domain]. In Cury F, Sarrazin P,
11 editors, *Théories de la motivation et pratiques sportives : état des recherches*
12 [Motivation theories in sport and physical activity contexts: a review of literature],
13 Paris: PUF 2001, pp. 255-276.
- 14 14. Smith AL. Youth peer relationships in sport. In S.J. Jowett & D. Lavallee, editors,
15 *Social Psychology in Sport*. Champaign, IL: Human Kinetics, 2007, pp. 41-54.
- 16 15. Ullrich-French S, Smith AL. Perceptions of relationships with parents and peers in
17 youth sport: Independent and combined prediction of motivational outcomes.
18 *Psychol Sport Exerc* 2006; 7: 193-214.
- 19 16. Sundgot-Borgen J, Torstveit MK. Prevalence of eating disorders in elite athletes is
20 higher than in the general population. *Clin J Sport Med* 2004; 14: 25-32.
- 21 17. Marsh HW. A multidimensional, hierarchical model of self-concept: theoretical and
22 empirical justification. *Educ Psychol R* 1990; 2: 77-172.
- 23 18. Carr S, Weigand DA, Jones J. The relative influence of parents, peers, and sporting
24 heroes on goal orientations of children and adolescents in sport. *J Sport Pedagogy*
25 2000; 6: 34-55.

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 13

- 1 19. Weiss MR, Smith AL. Quality of youth sport friendships: Measurement
2 development and validation. *J Sport Exerc Psychol* 1999; 21: 145-166.
- 3 20. Scoffier S, Maïano C, Arripe-Longueville F. (d'). Echelle de Qualité de l'Amité en
4 Sport (EQAS): Factor Validity and Reliability of the Sport Friendship Quality
5 Scale in a French Adolescent Sample (In press). *Int J Sport Psychol*.
- 6 21. Berndt TJ, Hawkins JA, Jiao Z. Influences of friends and friendships on adjustment
7 to junior high school. *Merrill Palmer Q* 1999; 45: 13-41.
- 8 22. Leichner P, Steiger H, Puentes-Neuman G, Perreault M, Gottheil N. Validation
9 d'une échelle d'attitudes alimentaires auprès d'une population québécoise
10 francophone [Validation of an eating attitude scale in a French-speaking Quebec
11 population]. *Can J Psychiatry* 1994; 39: 49-54.
- 12 23. Guérin F, Marsh HW, Famose JP. Construct validation of the Self-Description
13 Questionnaire II with a French sample. *Eur J Psychol Assess* 2003; 19: 142-160.
- 14 24. Bagozzi RP, Heatherton TF, A General Approach to Representing Multifaceted
15 Personality Constructs : Application To State Self-Esteem. *Struct Equation Model* 1994;
16 1: 35-67.
- 17 25. Arbuckle J. *AMOS 7.0 User's Guide*. Chicago, IL: SPSS, 2006.
- 18 26. Byrne B. Factor analytic models: Viewing the structure of an assessment instrument
19 from three perspectives. *J Pers Assess* 2005; 85: 17-35.
- 20 27. Hu L Bentler PM. Fit Indices in covariance structure modeling: sensitivity to
21 underparametrized model misspecification, *Psychol Methods* 1998; 3: 424-453.
- 22 28. Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance
23 literature: Suggestions, practices, and recommendations for organizational
24 research. *Org R Methods* 2000; 3: 4-70.
- 25 29. Bagozzi RP, Kimmel SK. A comparison of leading theories for the prediction of
26 goal directed behaviours. *Br J Soc Psychol* 1995; 34: 437-461.

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 14

- 1 30. Baron RM, Kenny DA. The moderator-mediator variable distinction in social
2 psychological research: Conceptual, strategic and statistical considerations. *J Pers*
3 *Soc Psychol* 1986; 51: 1173-1182.47.
- 4 31. Paxton SJ, Schutz HK, Wertheim EH, Muir SL. Friendship clique and peer
5 influences on body image concerns, dietary restraint, extreme weight-loss
6 behaviors, and binge-eating in adolescents girls. *J Abnorm Psycho* 1999; 108:
7 255-266.
- 8
9
10

For Review Only

FACTORS OF DISTURBED EATING ATTITUDES IN ELITE ATHLETE 15

1 Footnotes

2 ^[1, 2] Complete results from these analyses are available upon request from the first
3 author.

4

5

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 $p < .01$. ρ : 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.

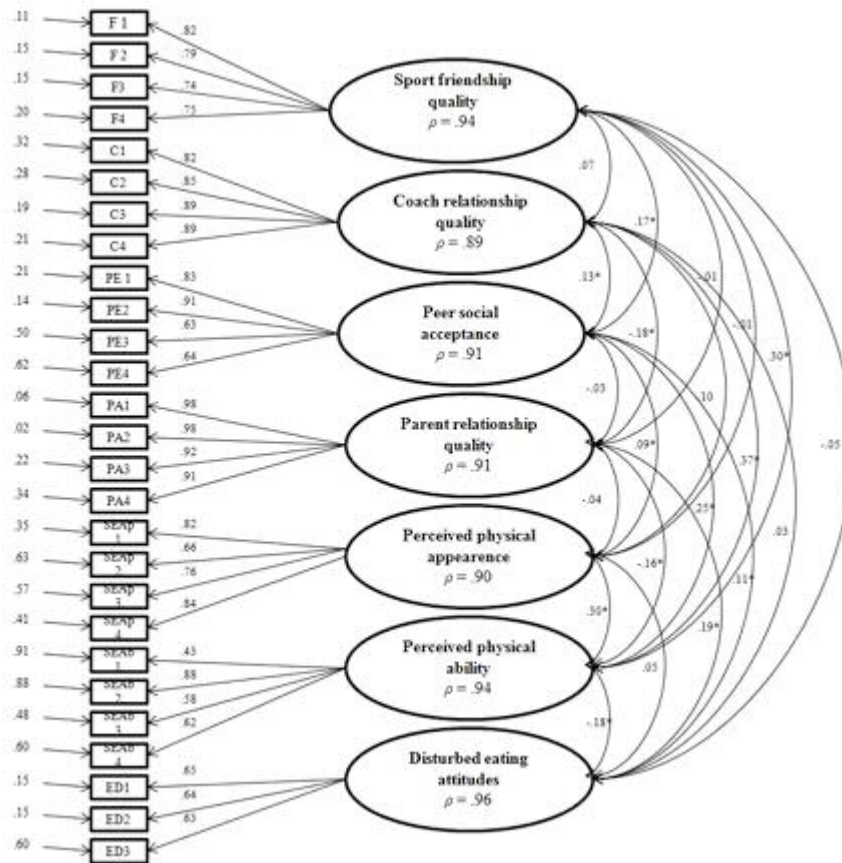
16

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.

20

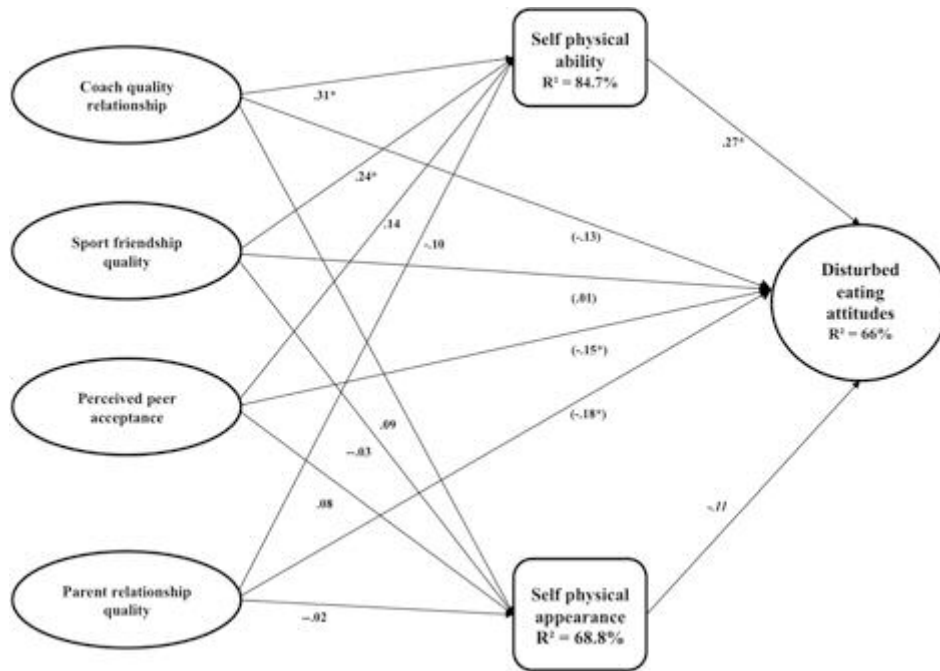
21

22



150x152mm (72 x 72 DPI)

Only



166x117mm (72 x 72 DPI)