Department of Statistical Sciences

University of Padua

Italy

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Alessio Vieno
Department of Developmental and Social Psychology
University of Padua

Maria Cristiana Martini
Department of Statistical Sciences
University of Padua

Massimo Santinello
Department of Developmental and Social Psychology
University of Padua

Lorenza Dallago
Department of Developmental and Social Psychology
University of Padua

Massimo Mirandola
Regional Centre for Health Promotion
Veneto Region

Abstract: Introduction: Body dissatisfaction is a determining factor in defining psychosocial well being in early adolescence. During this period, young people progressively redefine their aesthetic standards. This new body concept influences how girls evaluate and accept their own appearance and is related to the psychophysical changes they undergo during this developmental phase. The aim of this study is to investigate how this change in body image evolves in a sample of early adolescent girls. Sample: The sample was composed of 2,408 early adolescent females from the Veneto region, subdivided into three age groups (761 11-year-olds, 734 13-year-olds, and 913 15-year-olds). Results: Correspondence analysis reveals how, in the 11-years-old group, feeling unattractive is only related to being overweight; this relation, however changes with increases age, when feeling unattractive is not anymore a synonymous of being overweight, and a new association can be observed in older girls who feel underweight and perceive themselves as attractive. Conclusion: Body image components change considerably during the early adolescence transition.

Keywords: HBSC, correspondence analysis, early adolescent development, psychosocial well-being.

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Department of Statistical Sciences
Via Cesare Battisti, 241
35121 Padova
Italy

tel: +39 049 8274168
fax: +39 049 8274170
http://www.stat.unipd.it

Corresponding author:
Maria Cristiana Martini
tel: +39 049 827 4176
cri@stat.unipd.it
http://www.stat.unipd.it/cri

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Keywords: HBSC, correspondence analysis, early adolescent development, psychosocial well-being.

1   Introduction

Many adolescent girls report a high degree of body and appearance dissatisfaction, and this phenomenon has been found to be associated with a variety of behaviors aimed at losing weight (Crisp *et al.*, 1999; Regione Veneto, 2001; Schur *et al.*, 2000; Thompson *et al.*, 1999). Body image plays a crucial role in defining self-esteem and self-efficacy (Harter, 1991) and is also closely related to social competence, popularity with the opposite sex, and assertiveness. Furthermore, negative body image has been found to be associated with emotional distress and appearance rumination (Ohring *et al.*, 2002; Stice and Whitenton, 2002; Thompson et al., 1999).

During early adolescence, body image changes remarkably to accommodate the physical changes of puberty. Indeed, girls report much more body dissatisfaction than boys do, due to the considerable and conspicuous physical transformations they undergo during this period (Regione Veneto, 2001; Rosenblum and Lewis, 1999; Stice and Whitenton, 2002). Moreover, the hormonal changes girls experience with menarche can result in greater emotional fragility (Paikoff *et al.*, 1991), contributing to the structuring of cognitive processing biases, which places young teen girls at a higher risk for body dissatisfaction (Stice and Whitenton, 2002).

Recently, Franko and Striegel-Moore (2002), citing Nolen-Hoeksema and Girgus (1994), highlighted the interaction that occurs among physical changes, body dissatisfaction, and the social challenges girls must face during this period, concluding that these three factors can account for the psycho-social problems that are so frequently observed in girls of this age group. Lastly, the combination of changes in physical appearance, growing cognitive abilities, as well as a growing capacity for introspection may account for early adolescents' vulnerability to excessive worry about their appearance (Simon *et al.*, 1983).

Another important aspect to consider is the influence of widespread social stereotypes, typical of advanced capitalistic societies, which closely associate thinness with beauty. The consequence is that the two terms have become virtually synonymous (Cramer and Steinwert, 1998; Rosenblum and Lewis, 1999). In fact, many studies conducted in the United States, Canada, and Europe have revealed a widespread trend in girls who idealize thinness and overestimate the value other people attribute to this characteristic (Cash and Henry, 1995; Cohn and Adler, 1992; Jacobi and Cash, 1994).

Adolescents' social evaluation processes and the feedback they receive regarding personal appearance can be expected to change to correspond to changes in physical appearance and its goodness of fit with the prevailing societal standards (Lerner, 1983). Indeed, unattractive adolescents are more likely to receive negative feedback, such as criticism and teasing (Burns and Farina, 1992; Cash, 1995), and because the first phase of early adolescence (age 11) are characterized by pronounced egocentrism (Elkind, 1978), they can be highly vulnerable and sensitive to criticism about their appearance. Empirical studies have revealed an age-related trend, according to which girls in early adolescence associate their appearance with their weight. In other words, being "fat" corresponds to being "ugly" (Brownell, 1991; Rosenblum and Lewis, 1999; Tiggemann *et al.*, 2000). Moreover, the importance early adolescents attribute to body image increases with age, reaching a peak at around age 15, when

girls reach complete physical maturation (Hopwood *et al.*, 1990).

Lastly, according to Gardner, Friedman and Jackson (1999), adolescent girls tend to idealize very thin shapes as synonymous with beauty in general: being "slim" means being "cool".

Several researchers (Benjet and Hernndez-Guzman, 2002; Hayward *et al.*, 1999) have demonstrated how puberty has diverse psychological consequences, in function of the timing of menarche (Ge *et al.*, 2001; Stice and Bearman, 2001; Stice *et al.*, 2002; Williams and Currie, 2000). Let us not forget, however, that girls' bodies change continuously over this time span. For this reason, we chose to investigate how girls' body image changes in parallel with the physical and cognitive changes they undergo from age eleven (before puberty) to age fifteen (puberty completed).

Many studies (Benjet and Hernndez-Guzman, 2002) have proposed various explanations for the relation between body image and psychosocial well being, but little is known about how this relation develops. Thus, the purpose of the present study is to investigate this influence and to verify how it evolves during early adolescence development.

2   Methodology

The data presented here formed part of the 2000 pilot study "Health Behavior in School-aged Children" (HBSC), a self-completed questionnaire-based study whose aim is to learn more about early adolescents' and adolescents' health-related behaviors. The information and knowledge gained by this study aim to inform and influence policies and programs, especially health promotion and health education policies and programs, aimed at school-aged children (see also Wold *et al.*, 1994). All participating nations must abide by the sampling criteria set forth in the Research Protocol.

The international research protocol requires that three age groups be represented in the research project samples: school-attending eleven-, thirteen-, and 15-year-olds. These time periods were established to represent the onset of adolescence (age 11), the challenge of physical and emotional changes (age 13), and the middle teen years, when very important life and career decisions must be made (age 15).

2.1   Sample

A total of 82 junior high schools and 80 high schools were sampled. The questionnaire was filled out by a total sample of 2,408 female students from the Veneto region, subdivided into three age groups: 761 girls in the first year of junior high school (6th grade–approximately 11-years-old), 734 in the third year (8th grade–approximately 13-years-old), and 913 in the first year of high school (10th grade–approximately 15-years-old). The average sub-sample ages for the three age groups were 10.91, 12.93, and 14.51 years, respectively.

2.2   Procedure

Two-stage cluster sampling was used to select the sample (cf. Thompson, 2002): schools were first selected, and then classes were selected from this sample. The sample includes all students in the selected classes. This particular design ensures a sample population that accurately reflects the referent population. While cross-sectional in approach, the design is essentially an effort to simulate a longitudinal design.

The questionnaire was anonymous and self-administered. In order to ensure uniform conditions, questionnaires were handed out by the students' teachers, after participation in a training course conducted by University of Padova researchers. Participants took about one hour to complete the questionnaire.

The questionnaire had been designed to investigate early adolescents' most prevalent health-related behaviors. However, only data related to body image and psychosocial well being were analyzed for the present study.

2.3   Measures

Body image

Three items were used to measure body image:

- *Body size*: "Do you think your body is...?". Responses were given on a 5-point scale (from "much too thin" to "much too fat", with "about the right size" at the center of the scale). There was also a 6th option, corresponding to "I don't think about body".

- *Appearance*: "Do you think you are...?". Responses were given on a 5-point ordinal scale (from "very good looking" to "not good looking at all"). There was also a 6th response alternative, corresponding to "I don't think about my looks".

- *Dieting*: "Are you currently dieting to lose weight?" Responses were given on a 3-point nominal scale ("no, because my weight is fine", "no, but I do need to lose weight", and "yes").

Psychosocial well-being indicators

The psychosocial well-being indicators we examined in this study were the following:

- *Self-confidence*: "How often do you feel confident in yourself?".

- The fear of being *excluded*: "How often do you feel left out of things?".

- The fear of being *unable to cope*: "How often do you feel helpless?".

  Responses to these questions were given on a 5-point ordinal scale (from "never" to "always").

- *Irritability*: "In the last six months, how often have you felt irritable or in a bad temper?". Responses were given on a 5-point ordinal scale (from "rarely or never" to "just about every day").

Principal inertia	Adjusted inertia	Percentage of inertia	Cumulative percentage
0.31344	0.04648	59.85	59.85
0.23953	0.01713	22.11	81.95
0.18968	0.00546	7.05	89.00
0.17695	0.00352	4.55	93.55
0.16856	0.00248	3.20	96.75
0.15406	0.00110	1.42	98.17
0.14630	0.00059	0.76	98.94
0.14127	0.00035	0.45	99.38
0.13985	0.00029	0.37	99.75
0.13388	0.00010	0.13	99.89
0.13183	0.00006	0.08	99.97
0.12888	0.00002	0.03	99.99
0.12722	0.00001	0.01	100.00
Total	0.07750	100.00	

Table 1: Principal inertias, Benzécri adjusted inertias, percentages of adjusted inertia explained by the factors, and cumulative percentages of adjusted inertia explained by the factors for the correspondence analysis conducted on the subgroup of eleven-year olds

- *Loneliness*: "Do you ever feel lonely?". Responses were given on a 4-point ordinal scale (from "no" to "yes, very often".)

2.4   Statistical analysis

A cross-tabulation of the previously listed variables (all either nominal or ordinal) would have produced a multi-way contingency table; yet, it would have been anything but simple to interpret, due to the multiplicity and complexity of the relations among variables. Since our purpose is to identify and explore the structure of these multiple relations, we turn, rather, to multiple correspondence analysis (see, among others, Benzécri, 1973; Greenacre, 1984), which allows a graphical representation of all the nominal and ordinal response categories of the variables as points in a space defined by a limited number of dimensions (or axes), which constitute the main factors underlying the variables.

From a mathematical perspective, this approach can be viewed as a special type of principal component analysis, i.e., a sort of exploratory factor analysis. It represents data in a parsimonious and rational way and thus provides an immediate understanding of the relations among data.

In order to evaluate the different characteristics of the girls in the three age groups, separate correspondence analyses are conducted on each subgroup. Correspondence analysis is performed by applying the CORRESP procedure of the SAS package (SAS Institute Inc., 1994, 2000).

3   Results

Table 1 reports the principal inertias (i.e., the variability accounted for by the principal axes), the same inertias adjusted according to the method proposed by Benzécri (1979) and described by Greenacre (1984), the percentages of adjusted inertia explained by the factors, and the cumulative percentages for the correspondence analysis of the 11-year-old girls' data. The percentages of inertia indicate the presence of two relevant dimensions, which explain 57.65% and 27.93%, respectively, of the Benzécri adjusted inertia. The two-dimensional display is plotted in Fig. 1, where response categories referring to ordinal scales are connected by lines highlighting the continuous trend of these variables. Table 2 reports the corresponding numerical results, i.e., the masses associated with each point, which are proportional to the relative frequencies; the point coordinates, which determine the position of each point in the two-dimensional graph; the relative contributions (or squared angle cosines), which indicate the contribution of a factor to the variability of each point; and the contributions to inertia, i.e., the contribution of each point to defining an axis.

An inspection of the plot (Fig. 1) shows a U-shaped configuration centered approximately at the origin; this indicates that the second factor is a non-linear combination of the first one. The presence of this shape, called the "Guttman effect" (Guttman, 1941), suggests a mainly unidimensional phenomenon, and this finding enables us to synthesize variables into a single factor, which we label as "psychosocial well-being". This single factor is determined mostly by variables concerning dieting, loneliness, and body size (especially aspects that regard feeling overweight). Other aspects, such as being left out of things and coping, also have a strong influence, whereas self-confidence, irritability, and appearance make a less significant contribution.

The data suggest that girls with a body image that is far from the current ideal are either dieting or think they should be dieting. They judge their physical appearance as not very pretty and also manifest low self-confidence and high loneliness. At the opposite end of the continuum, we find girls with high levels of psychosocial well being as well as a good body image.

We can also see (Fig. 1) that negative appearance perception ("not at all good looking") is associated with girls' perception of being overweight ("too fat"), while "too thin" is situated in an intermediate position and do not significantly contribute to "psychosocial well-being". "Not thinking about looks" and "Not thinking about weight" are situated in a neutral position: these findings suggest that some girls derive no particular anxiety and dissatisfaction from their appearance and weight, presumably because they do not care too much about it.

From Table 2 (the "Mass" column) we can infer that most girls at age 11 think their weight is just right and that there is thus no reason to diet. Furthermore, most of these girls feel self-confident, are not irritable, and rarely feel helpless.

We repeat the correspondence analysis for the 13-year-old group (Tab. 3). The decomposition of inertia reveals two main axes, the first of which is clearly more significant than the second, since it accounts for 67.3% of the adjusted inertia vs. 6.9% for the second dimension. The overall inertia explained by the first two components

Name	Mass	Coordinates		Relative contributions		Contributions to inertia	
		k=1	k=2	k=1	k=2	k=1	k=2
Body size							
Much too thin	0.005	-0.004	-0.682	0.000	0.020	0.000	0.010
A bit too thin	0.010	-0.342	-0.045	0.010	0.000	0.004	0.000
About the right size	0.060	-0.394	-0.069	0.141	0.004	0.030	0.001
A bit too fat	0.037	0.683	-0.138	0.199	0.008	0.056	0.003
Much too fat	0.004	1.758	0.899	0.102	0.027	0.040	0.014
I don't think about body	0.009	-0.637	1.071	0.032	0.089	0.012	0.043
Appearance							
Very good looking (1)	0.010	-0.829	0.846	0.057	0.059	0.021	0.029
Quite good looking (2)	0.035	-0.331	-0.136	0.043	0.007	0.012	0.003
About average (3)	0.050	-0.041	-0.311	0.001	0.065	0.000	0.020
Not very good looking (4)	0.017	0.653	-0.297	0.067	0.014	0.023	0.006
Not at all good looking (5)	0.007	1.554	1.097	0.147	0.073	0.055	0.036
I don't think about looks	0.006	-0.084	1.623	0.000	0.129	0.000	0.064
Dieting							
No, weight is fine	0.081	-0.385	-0.069	0.275	0.009	0.038	0.002
No, but I do need	0.030	0.781	0.115	0.193	0.004	0.059	0.002
Yes	0.014	0.569	0.159	0.040	0.003	0.014	0.001
Self confidence							
Always (5)	0.035	-0.491	0.623	0.094	0.151	0.027	0.057
Often (4)	0.048	-0.171	-0.449	0.018	0.126	0.005	0.041
Sometimes (3)	0.023	0.451	-0.296	0.046	0.020	0.015	0.009
Rarely (2)	0.012	0.879	-0.189	0.082	0.004	0.030	0.002
Never (1)	0.007	0.677	1.366	0.025	0.103	0.010	0.051
Excluded							
Never (5)	0.036	-0.716	0.639	0.206	0.164	0.059	0.061
Rarely (4)	0.039	-0.093	-0.470	0.004	0.101	0.001	0.036
Sometimes (3)	0.036	0.358	-0.385	0.052	0.060	0.015	0.022
Often (2)	0.012	1.111	0.385	0.130	0.016	0.047	0.007
Always (1)	0.002	1.474	2.243	0.038	0.089	0.015	0.046
Unable to cope							
Never (5)	0.024	-0.654	0.856	0.102	0.175	0.033	0.074
Rarely (4)	0.044	-0.299	-0.133	0.048	0.010	0.013	0.003
Sometimes (3)	0.043	0.200	-0.602	0.021	0.188	0.006	0.065
Often (2)	0.013	1.227	0.552	0.168	0.034	0.060	0.016
Always (1)	0.002	2.460	1.966	0.099	0.063	0.039	0.032
Irritability							
Rarely or never (5)	0.042	-0.467	0.353	0.112	0.064	0.030	0.022
About every month (4)	0.028	-0.296	-0.302	0.025	0.026	0.008	0.011
About every week (3)	0.022	0.164	-0.522	0.006	0.059	0.002	0.025
More than once a week (2)	0.023	0.555	-0.023	0.071	0.000	0.023	0.000
About every day (1)	0.009	1.212	0.589	0.119	0.028	0.044	0.014
Loneliness							
No (4)	0.037	-0.762	0.445	0.245	0.084	0.069	0.031
Yes, sometimes (3)	0.065	0.058	-0.437	0.004	0.208	0.000	0.052
Yes, rather often (2)	0.010	0.753	-0.441	0.048	0.016	0.018	0.008
Yes, very often (1)	0.013	1.318	1.243	0.202	0.180	0.072	0.084

Table 2: Masses, point coordinates, relative contributions and contributions by the points to the principal axes for the correspondence analysis conducted on the subgroup of eleven-year olds
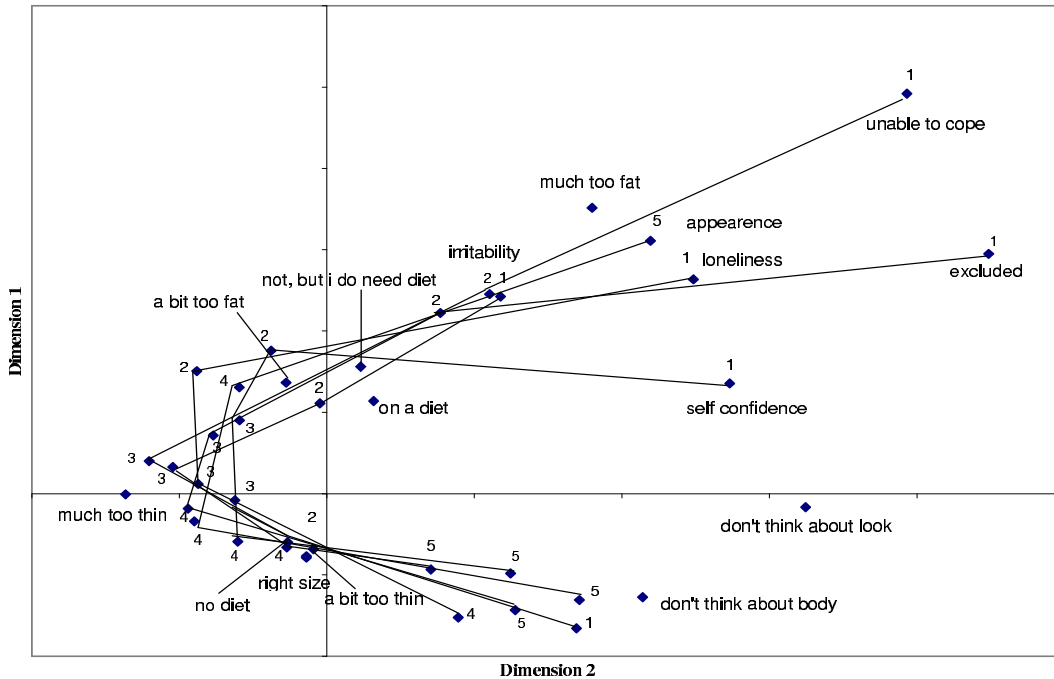
Fig. 1. Correspondence analysis for the 11-years-old

Figure 1: Correspondence analysis for the 11-year-olds

is 84.2%, very similar to the results obtained for 11-year-old girls.

A bidimensional representation of the variables (Fig. 2) shows the Guttman effect (1941) and, therefore, the basic unidimensionality of the phenomenon, suggesting the same principal factor of psychosocial well being observed previously for the 11-year-old girls. The determinants of this factor are essentially the same as for the latent unidimensional factor yielded in the previous analysis (Tab. 4).

We can note several important differences for 13-year-olds: first, table 4 shows the increase in the proportion of girls believing they are overweight, who would like to diet, and who are not satisfied with their appearance. Moreover, self-confidence decreases, while the number of girls feeling left out of things, helpless, lonely, and irritable increases.

Furthermore, figure 2 shows that perceiving one's self as "too fat" and negative appearance perception ("not at all good looking"), which for the younger girls practically coincided, slightly deviate here. This can indicate the end of the overlap observed in 11-year-old girls between overweight and negative appearance. Indeed, for 13-year-olds, feeling "too thin", which for 11-year-olds had no particular meaning, is closer to "not thinking about" one's body and almost overlaps with "not thinking about looks".

The same analysis performed on 15-years-olds (Tab. 5) shows a main axis explaining 64.7% of the inertia, adjusted according to Benzécri (1979), whereas the second axis captures only 15.5% of the adjusted inertia. Again, the analysis reveals a

Principal inertia	Adjusted inertia	Percentage of inertia	Cumulative percentage
0.33462	0.05739	67.34	67.34
0.22992	0.01438	16.87	84.21
0.19795	0.00695	8.16	92.36
0.16753	0.00236	2.77	95.13
0.15745	0.00138	1.61	96.75
0.15041	0.00084	0.99	97.74
0.14944	0.00078	0.92	98.65
0.14689	0.00063	0.73	99.39
0.13981	0.00029	0.34	99.72
0.13486	0.00013	0.15	99.87
0.13252	0.00007	0.09	99.96
0.13022	0.00004	0.04	100.00
Total	0.08523	100.00	

Table 3: Principal inertias, Benzécri adjusted inertias, percentages of adjusted inertia explained by the factors, and cumulative percentages of adjusted inertia explained by the factors for the correspondence analysis conducted on the subgroup of thirteen-year olds
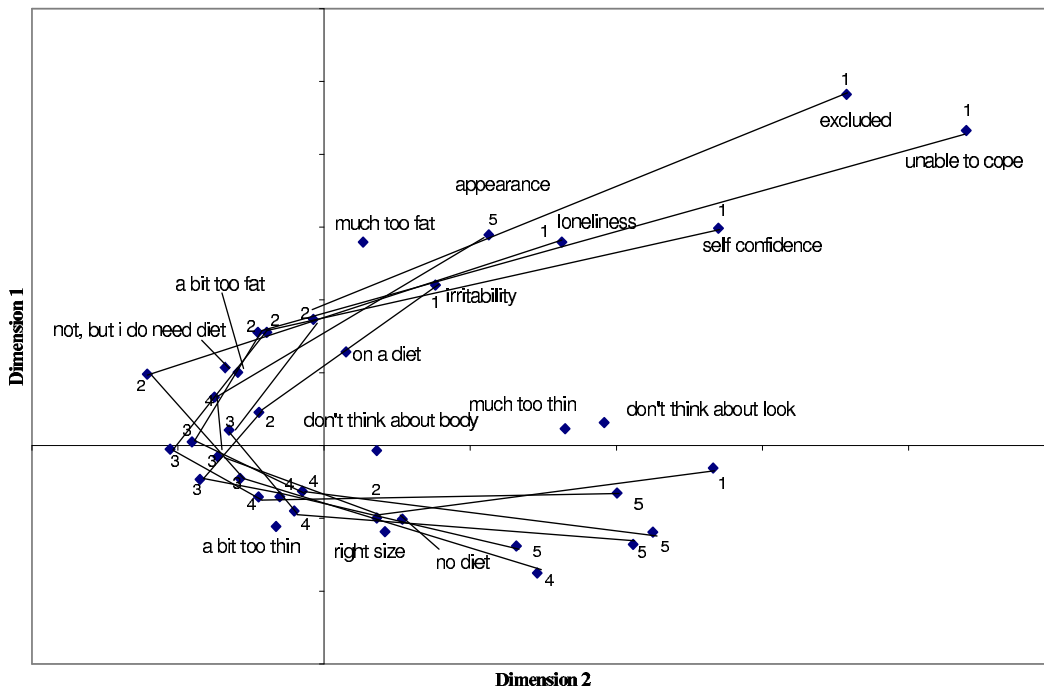

Fig. 2. Correspondence analysis for the 13-years-old

Figure 2: Correspondence analysis for the 13-year-olds

U-shape, a single main factor, which, once again, can be interpreted as a dimension of psychosocial well being, closely tied to girls' body image (Fig. 3). Contributions

		Coordinates		Relative contributions		Contributions to inertia	
Name	Mass	k=1	k=2	k=1	k=2	k=1	k=2
Body size							
Much too thin	0.004	0.116	0.824	0.000	0.022	0.000	0.011
A bit too thin	0.009	-0.556	-0.165	0.025	0.002	0.009	0.001
About the right size	0.048	-0.592	0.208	0.221	0.027	0.051	0.009
A bit too fat	0.048	0.503	-0.295	0.158	0.054	0.036	0.018
Much too fat	0.007	1.397	0.134	0.112	0.001	0.040	0.001
I don't think about body	0.009	-0.035	0.180	0.000	0.002	0.000	0.001
Appearance							
Very good looking (1)	0.005	-0.155	1.331	0.001	0.075	0.000	0.039
Quite good looking (2)	0.037	-0.505	0.268	0.106	0.030	0.028	0.011
About average (3)	0.049	-0.076	-0.364	0.004	0.087	0.001	0.029
Not very good looking (4)	0.020	0.333	-0.375	0.021	0.027	0.007	0.012
Not at all good looking (5)	0.011	1.448	0.563	0.202	0.031	0.069	0.015
I don't think about looks	0.003	0.157	0.958	0.001	0.022	0.000	0.012
Dieting							
No, weight is fine	0.067	-0.498	0.180	0.284	0.037	0.050	0.009
No, but I do need	0.040	0.535	-0.339	0.132	0.053	0.034	0.020
Yes	0.019	0.643	0.075	0.073	0.001	0.023	0.001
Self confidence							
Always (5)	0.021	-0.326	1.003	0.021	0.198	0.007	0.090
Often (4)	0.047	-0.353	-0.224	0.075	0.030	0.018	0.010
Sometimes (3)	0.034	-0.025	-0.527	0.000	0.103	0.000	0.041
Rarely (2)	0.016	0.777	-0.196	0.087	0.006	0.028	0.003
Never (1)	0.008	1.492	1.350	0.152	0.125	0.053	0.063
Excluded							
Never (5)	0.016	-0.678	1.058	0.065	0.158	0.021	0.075
Rarely (4)	0.036	-0.450	-0.103	0.083	0.004	0.022	0.002
Sometimes (3)	0.054	0.106	-0.326	0.009	0.082	0.002	0.025
Often (2)	0.016	0.866	-0.037	0.108	0.000	0.035	0.000
Always (1)	0.003	2.412	1.788	0.150	0.082	0.055	0.044
Unable to cope							
Never (5)	0.018	-0.595	1.125	0.059	0.212	0.019	0.099
Rarely (4)	0.039	-0.314	-0.075	0.045	0.003	0.012	0.001
Sometimes (3)	0.046	0.025	-0.452	0.000	0.118	0.000	0.041
Often (2)	0.019	0.777	-0.227	0.105	0.009	0.033	0.004
Always (1)	0.004	2.163	2.198	0.134	0.138	0.049	0.073
Irritability							
Rarely or never (5)	0.022	-0.689	0.658	0.102	0.093	0.031	0.042
About every month (4)	0.023	-0.351	-0.152	0.028	0.005	0.009	0.002
About every week (3)	0.027	-0.233	-0.425	0.015	0.050	0.004	0.021
More than once a week (2)	0.033	0.228	-0.223	0.018	0.018	0.005	0.007
About every day (1)	0.020	1.102	0.381	0.234	0.028	0.073	0.013
Loneliness							
No (4)	0.022	-0.875	0.730	0.162	0.112	0.050	0.050
Yes, sometimes (3)	0.067	-0.227	-0.288	0.059	0.095	0.010	0.024
Yes, rather often (2)	0.019	0.490	-0.605	0.042	0.064	0.013	0.030
Yes, very often (1)	0.018	1.397	0.813	0.327	0.111	0.105	0.052

Table 4: Masses, point coordinates, relative contributions and contributions by the points to the principal axes for the correspondence analysis conducted on the sub-group of thirteen-year olds

Principal inertia	Adjusted inertia	Percentage of inertia	Cumulative percentage
0.31523	0.04727	64.75	64.75
0.21817	0.01134	15.53	80.28
0.20684	0.00875	11.98	92.26
0.16081	0.00168	2.29	94.56
0.15368	0.00107	1.47	96.03
0.15145	0.00091	1.25	97.28
0.14760	0.00067	0.91	98.19
0.14418	0.00048	0.66	98.85
0.14248	0.00040	0.55	99.40
0.13749	0.00020	0.28	99.68
0.13560	0.00015	0.20	99.88
0.13277	0.00008	0.11	99.99
0.12788	0.00001	0.01	100.00
Total	0.07300	100.00	

Table 5: Principal inertias, Benzécri adjusted inertias, percentages of adjusted inertia explained by the factors, and cumulative percentages of adjusted inertia explained by the factors for the correspondence analysis conducted on the subgroup of fifteen-year olds

to inertia (Tab. 6) do not greatly differ from the ones seen for the previous analyses.

In spite of these similarities, there are also important differences for 15-year-old girls. The number of girls feeling overweight and dieting increases, but the number of girls dissatisfied with their appearance decreases (Tab. 6). No significant differences are noted, however, for self-confidence, loneliness, feeling left out of things, helpless or irritable.

Figure 3 reveals how, on the positive side of the psychosocial well being axis, we can still find the point regarding positive appearance perception. It is not, however, associated with "not thinking about" one's body (as was true for the 11-year-olds) nor with weight considered "about the right size" (as was true for the 13-year-olds), but rather, with feeling "too thin". At the opposite end of the psychosocial well being axis, we observe a large distinction between negative appearance perception and feeling "too fat". Indeed, these two aspects are highly differentiated for 15-year-olds. Lastly, "not thinking about looks" is situated at the negative extreme for these older girls.

4   Discussion

A single dimension of "well-being", comprising self confidence, irritability, loneliness, and body image is present for all three age groups, despite some differences observed for body-related components, in function of participants' specific developmental phase.

In the first phase of early adolescence (age 11) we observe a similar finding to that of Rosenblum and Lewis (1999), i.e., an overlap between body size dissatisfaction and appearance dissatisfaction; in other words, feeling overweight means

Name	Mass	Coordinates		Relative contributions		Contributions to inertia	
		k=1	k=2	k=1	k=2	k=1	k=2
Body size							
Much too thin	0.001	-0.510	-0.030	0.003	0.000	0.001	0.000
A bit too thin	0.007	0.084	0.356	0.000	0.007	0.000	0.004
About the right size	0.044	-0.578	0.072	0.183	0.003	0.047	0.001
A bit too fat	0.058	0.281	-0.159	0.068	0.022	0.015	0.007
Much too fat	0.007	1.546	-0.205	0.138	0.002	0.052	0.001
I don't think about body	0.008	-0.158	0.646	0.002	0.028	0.001	0.015
Appearance							
Very good looking (1)	0.006	-0.707	0.470	0.023	0.010	0.009	0.006
Quite good looking (2)	0.037	-0.255	0.024	0.028	0.000	0.008	0.000
About average (3)	0.056	-0.203	-0.140	0.033	0.016	0.007	0.005
Not very good looking (4)	0.018	0.636	-0.309	0.069	0.016	0.023	0.008
Not at all good looking (5)	0.006	1.873	1.220	0.180	0.077	0.068	0.042
I don't think about looks	0.002	0.821	1.190	0.011	0.024	0.005	0.014
Dieting							
No, weight is fine	0.055	-0.483	0.153	0.185	0.019	0.041	0.006
No, but I do need	0.038	0.416	-0.214	0.074	0.020	0.021	0.008
Yes	0.032	0.345	-0.014	0.041	0.000	0.012	0.000
Self confidence							
Always (5)	0.015	-0.150	1.421	0.003	0.284	0.001	0.143
Often (4)	0.046	-0.544	-0.206	0.175	0.025	0.044	0.009
Sometimes (3)	0.039	0.194	-0.375	0.017	0.064	0.005	0.025
Rarely (2)	0.018	0.717	-0.425	0.085	0.030	0.029	0.015
Never (1)	0.006	1.132	1.539	0.069	0.128	0.026	0.069
Excluded							
Never (5)	0.015	-0.771	1.128	0.081	0.174	0.028	0.088
Rarely (4)	0.042	-0.425	-0.170	0.091	0.015	0.024	0.006
Sometimes (3)	0.049	0.171	-0.377	0.019	0.092	0.005	0.032
Often (2)	0.016	1.028	0.069	0.156	0.001	0.054	0.000
Always (1)	0.003	1.507	2.609	0.054	0.163	0.021	0.091
Unable to cope							
Never (5)	0.015	-0.527	1.138	0.038	0.177	0.013	0.089
Rarely (4)	0.035	-0.540	0.152	0.115	0.009	0.033	0.004
Sometimes (3)	0.050	0.019	-0.467	0.000	0.146	0.000	0.050
Often (2)	0.021	0.875	-0.345	0.152	0.024	0.050	0.011
Always (1)	0.004	2.055	2.074	0.136	0.138	0.052	0.077
Irritability							
Rarely or never (5)	0.018	-0.500	0.485	0.042	0.039	0.014	0.019
About every month (4)	0.028	-0.645	0.077	0.117	0.002	0.036	0.001
About every week (3)	0.027	-0.105	-0.386	0.003	0.041	0.001	0.019
More than once a week (2)	0.033	0.341	-0.261	0.042	0.025	0.012	0.010
About every day (1)	0.019	0.938	0.435	0.161	0.035	0.054	0.017
Loneliness							
No (4)	0.021	-0.830	0.704	0.140	0.101	0.046	0.048
Yes, sometimes (3)	0.069	-0.266	-0.247	0.087	0.075	0.016	0.019
Yes, rather often (2)	0.019	0.742	-0.401	0.100	0.029	0.034	0.014
Yes, very often (1)	0.016	1.386	0.639	0.273	0.058	0.095	0.029

Table 6: Masses, point coordinates, relative contributions and contributions by the points to the principal axes for the correspondence analysis conducted on the sub-group of fifteen-year olds
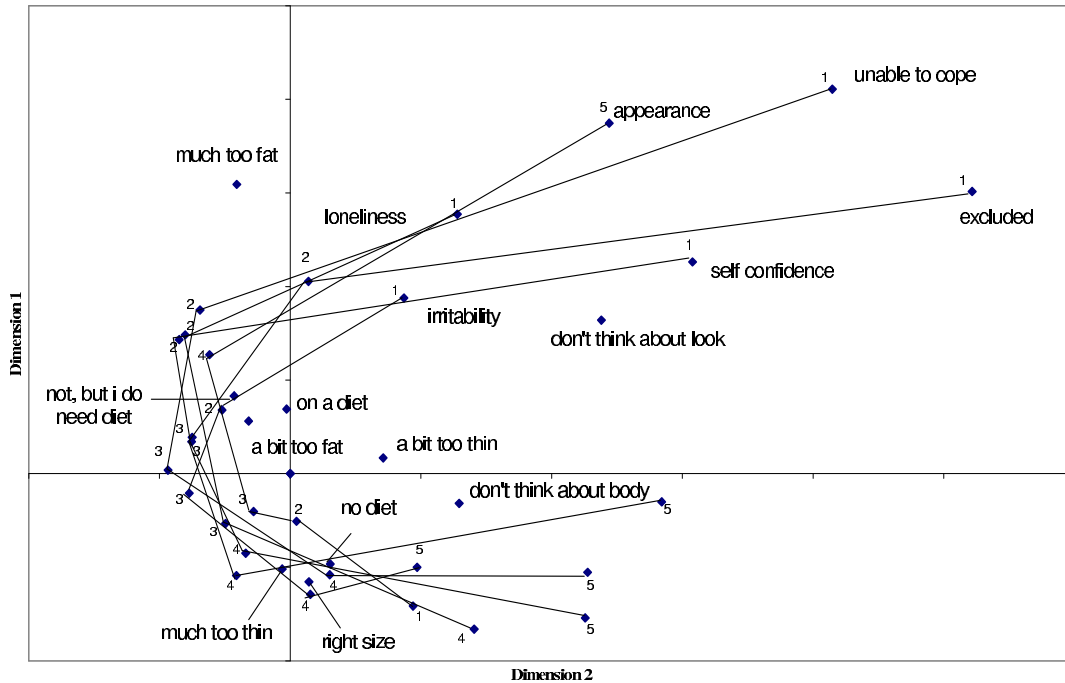
Fig. 3. Correspondence analysis for the 15-years-old

Figure 3: Correspondence analysis for the 15-year-olds

feeling unattractive. This phenomenon is due to the fact that the main reason for experiencing discrimination at age 11 is being overweight. We can hypothesize that, overweight girls who receive the worse teasing by their peers. Moreover, girls who don't think about their body size and appearance are collocated in a neutral position: this suggests that body image has not yet become important for them.

In the second phase (age 13), when girls experience the most important physical modifications of their pubertal development, we observe a progressive re-definition of the components that influence body image, i.e., being too thin and not thinking about personal appearance coincided. This result might be interpreted as the consequence of a denial mechanism, activated by girls who have not yet developed a female shape. Perhaps, since they perceive themselves as too thin, they avoid thinking about their appearance. Indeed, we also note that the answer don't think about looks shifts towards the negative extreme of psychosocial well being.

Lastly, in the third phase (age 15), when girls reach their definitive body shape, they accept and define personal appearance not exclusively as a consequence of being overweight. At the same time, however, perceiving one's self as "too thin" becomes an important part of the positive extreme of well being (Gardner et al., 1999). These results confirm the popular trend (strongly influenced by the mass media) that considers thinness a necessary component of happiness (Cramer and Steinwert, 1998). This tendency is also confirmed by girls who say they "don't think about

looks" and are highly polarized at the negative extreme of psychosocial well being. We can interpret this as an expression of appearance dissatisfaction: you deny its importance by saying you don't think about it.

5   Conclusions

Our results provide support for Rosenblum and Lewis' (1999) findings, according to which during this life cycle phase, a modification can be observed in the structuring of girls' body image and its relationship with psychosocial well-being (Benjet and Hernndez, 2002).

During the first phase of early adolescence (age 11), girls apparently don't pay much attention to the role their bodies can have in mediating social relationships; therefore, the only reason for being teased is being overweight. Indeed, our analysis reveals an essential overlap between feeling overweight and feeling unattractive. This body image apparently changes with development and the onset of menarche, when it seems that girls re-define their body image. Hence, being thin at age 13 means being beautiful. Yet, being overweight–though still maintaining a negative connotation– is no longer synonymous with ugliness. With the transition to the full phase of adolescence at age 15, appearance takes on a main role in defining well being. During this phase, however, the equation overweight-ugliness is discarded for good, and the concept of beauty as equivalent to being underweight emerges rather clearly.

We find this last concept rather disturbing, since it corresponds to one important characteristic of Anorexia. Indeed, anorexics express basic satisfaction with their appearance, a high degree of psychosocial well being (though fictitious), and the idealization of thin figures. The disquieting phenomenon we observe provides further evidence for how our young women introject aesthetic canons and ideals, according to which thinness equals beauty (Rosenblum and Lewis, 1999).

Our study does have some limitations, however. The main one is that we were not able to obtain data on our participants' actual pubertal development. Had this been possible, we might have obtained further confirmation of our interpretations concerning the subgroup of girls who say they do not think about their bodies, i.e., that they do so because they are "late bloomers".

One final suggestion is that, given the particular changes that take place in girls' bodies during early adolescence, it might be interesting to verify girls' perceptions of their own different body parts, such as hips or breasts. This information might be of help in verifying if dissatisfaction with personal appearance is closely linked to the physical maturation of specific body parts.

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