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Eating Problems and Their Risk Factors: A 7-Year Longitudinal Study of a Population Sample of Norwegian Adolescent Girls

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The longitudinal stability of eating problems and their relationships to risk factors were investigated in a representative population sample of 623 Norwegian girls aged 13–14 followed over 7 years (3 time points). Three eating problem symptoms were measured: Restriction, Bulimia-food preoccupation, and Diet, all taken from the12-item Eating Attitudes Test. The aim of the study was to investigate the stability of these eating problem symptoms both as separate components (as opposed to total symptom load) as well as from a syndrome perspective. Over 7 years, dieting behavior showed the highest correlational stability (0.32). Regarding stable eating problem syndromes, at all 3 time points, 1 group of girls with generalized eating problems was found, characterized by simultaneously pronounced bulimic tendencies and dieting. However, we did not establish individual stability across 7 years for this syndrome group. Through development, eating problem symptoms were associated with characteristic risk factors. Similarities and differences between findings regarding eating problems and eating disorders are discussed.

KEY WORDS: eating problems; adolescents; girls; longitudinal; risk factors.

INTRODUCTION

Different Types of Eating Problems

Eating disorders are divided mainly into 2 categories: Anorexia Nervosa (AN) and Bulimia Nervosa (BN). The disorders have separate criteria in the *DSM-IV* although they share common core symptoms. Also, an individual can show a combination of the two (American Psychiatric Association, 1994). Eating disorders are one of the most common disorders among adolescent girls in the West (Whitaker *et al*., 1990), and many more are estimated to suffer from milder forms of these disorders i.e., eating problems that do not fulfil all of the diagnostic criteria of eating disorders (Garfinkel *et al*., 1995; Stein *et al*., 1997). These kinds of problems are at focus in the present study, not eating disorders.

Different types of eating problems have been identified as indicated by the 3 factors underlying the Eating Attitudes Test (EAT; Garner *et al*., 1982). The 1st factor, *restriction*, measures self-control of eating and perceived social pressure to gain weight, reflecting tendencies to AN. The 2nd factor, *bulimia-food preoccupation*, addresses behaviors such as self-induced vomiting, binge-eating, and compensatory behavior as exercise to burn off calories and is considered to reflect eating problems with a character of BN. The 3rd factor, *diet*, measures the avoidance of fattening foods, engaging in dieting behavior, and preoccupation with a thin body shape.

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Regarding the stability of eating problems, approximately 40–50% of the individuals with disordered eating show stability in their symptoms over a period of 2 years (Leon *et al*., 1995; Wichstrøm, 2000). However, in an 8-year study of eating problems, Graber *et al*. (1994) reported a longitudinal correlation of 0.37 over 5 years for the 26-item EAT, but the correlation over 8 years was non-significant. Studying the stability of eating problems is important to know if individuals' problems usually are transient or chronic.

Most studies on disordered eating have summed up different types of symptoms using the total symptom load as an eating problem indicator and/or have been conducted with student or treatment seeking populations (e.g., Fitzgibbon *et al*., 2003). Therefore, information is lacking on the stability and change of different eating problem symptoms as well as on how they combine to syndromes in population samples.

Risk Factors for Eating Problems

Low self-esteem has been proposed as a risk factor for disordered eating, but results have been contradictory. In a longitudinal study of Button *et al*. (1996), girls with low self-esteem at the ages of 11–12 were found to be about 8 times more at risk of exhibiting high eating problem scores 3–4 years later. Also, in a 2-year prospective study on eating disorders using a Swedish general population sample, Ghaderi and Scott (2001) found females, who did not have an eating disorder at the time of the initial testing but who developed one at follow-up, to be characterized by lower levels of self-esteem and greater body concern (e.g., feelings of fatness) as compared to controls. In contrast, 2 other longitudinal studies did not find low self-esteem to predict eating problems (Gardner *et al*., 2000; Leon *et al*., 1995).

Some have proposed that an insecure (i.e., unstable) self contributes to the development of eating disorders as concentrating on others' perceptions of oneself and one's appearances may provide a concrete way of constructing an identity (Bruch, 1973; Striegel-Moore, 1993). Unstable self-perceptions can be seen as an agent for developing eating problems in this sense, as unstable self-perceptions, especially in combination with low self-esteem (see Campbell *et al*., 1991), would be indicative of a continuing reliance on outer cues for self-knowledge. However, unstable self-perceptions may alternatively be a result of an eating problem: Dieting has been found to promote binge eating (see Fairburn, 1997; Polivy and Herman, 1985), and if an individual's self-worth is strongly attached to perceived success in dietary restraint, the dieting-binge cycle may lead to changes in this perceived success, resulting in one's self-perceptions varying accordingly.

Regarding the role of body dissatisfaction in the development of disordered eating, results from both cross-sectional (e.g., Fairburn *et al*., 1997; Leon *et al*., 1993) and longitudinal studies (e.g., Gardner *et al*., 2000; Ghaderi and Scott, 2001) have demonstrated it to be involved in the development of disordered eating. However, information on the longitudinal stability of body dissatisfaction in population samples is needed.

Regarding the association between Body Mass Index (BMI; Garrow and Webster, 1985) and disordered eating, evidence is mixed: Some studies have not found individuals with eating problems to differ from individuals without eating problems with regard to BMI (Ghaderi and Scott, 1999), whereas others have found individuals with higher BMI to have higher eating problems scores (Gardner *et al*., 2000).

Many of the risk factors for disordered eating discussed above are interrelated, for example, self-esteem is related to self-perception stability in that low self-esteem individuals show more instability and inconsistency in their self-descriptions (Campbell, 1990). Self-esteem is also associated body dissatisfaction: High self-esteem individuals tend not to "feel fat," whereas having low self-esteem predicts feelings of fatness even after weight is controlled for (Tiggemann, 1996). Regarding BMI and body dissatisfaction, heavier girls report more dissatisfaction (Ohring *et al*., 2002). Nevertheless, many perceive themselves to be heavier than they are. For instance, Mintz and Betz (1986) found that 64% of the women, within normal BMI limits, perceived themselves as being slightly overweight, and 9% as being overweight.

The risk factors discussed above have shown to be relatively stable over time: Wichstrøm (2000) reported that the correlation across 2 years was 0.63 for perceived obesity, 0.50 for unstable self-perceptions, and 0.64 for body dissatisfaction. Similarly, the level of self-esteem has been found to stabilize and level off by late adolescence and early adulthood (see Harter, 1998; Rosenberg, 1979).

The Person-Oriented Perspective

Complementing the ordinary variable-oriented approach, the present study will use a person-oriented approach based on an interactional model of individual development and functioning in which the individual is seen from a holistic perspective: Factors in the individual (e.g.,

mental) and factors outside the individual (e.g., culture) continuously interact with one another and operate together in a lawful way in order to optimize individual functioning (Magnusson, 1998).

Studying change from an interactional perspective emphasizes that development occurs in several interacting variables simultaneously as opposed to isolated variables. Maladjustment, such as eating problems, rarely results from a single variable (e.g., body dissatisfaction), and a set of variables may function differently among different individuals (Magnusson, 1998). This seems to be true even regarding eating problems: Although many adolescent girls are dissatisfied with their appearances and diet, only a small proportion develop eating problems and even fewer fall ill in eating disorders. Bergman and Magnusson (1997) claim that often only a small number of typical configurations or patterns of values in the relevant variables tend to occur. In many situations, these typical patterns contain essential information about the systems under study, information that is lost if the variables are studied as separate identities using, for example, a correlational approach. These typical configurations can be found by looking for groups of individuals where those in the same group have a similar value pattern. In our context, one type of pattern studied by such a method would be the configuration of values in the 3 eating problems considered simultaneously.

Purpose of the Study

The aim of the present study was to investigate the longitudinal stability of eating problems as well as their relationships to risk factors over 2, 5, and 7 years. Eating problem symptoms are studied as separate components (as opposed to total symptom load). This has not been done with representative population samples to the knowledge of the authors. A person-oriented perspective was also applied in which eating problem syndromes were studied. Questions we tried to answer then included the following: Do eating problem symptoms form the same typical syndromes at different ages?, Do individuals show stability in their syndrome group membership over time? Finally, it was investigated if structurally stable eating problem syndrome groups could be associated with characteristic risk factors. The role of self-esteem and unstable self-perceptions in the initiation and maintenance of disordered eating were specifically focused on. It was hypothesized that being high in unstable self-perceptions in combination with being low on self-esteem would be a strong risk factor for exhibiting eating problems.

METHOD

Participants

This study was conducted on a representative population sample of Norwegian adolescent girls tested at 3 points in time. Data were taken from the Young in Norway study (Wichstrøm, 1995a). Participants were recruited through cluster sampling using the school as a unit from a register including every school in Norway. The sample was stratified according to geographical area and school size and the sampling probability of each school was proportional to the number of students at the school. In Norway, approximately 98% of the age cohorts of 12–16 years attend public junior high schools and after graduating, 97% begin senior high school. Participation rate was 97% ($N = 5287$) at initial time of testing (t1) 1992.

To the present study, all girls with complete data on the EAT-12 variables at all 3 time points were included in the analyses ($n = 623$). The 7-year longitudinal analyses included 40% of all the 13- to14-year-old girls at t1. The girls were followed up after 2 years (t2) and 5 years (t3), respectively. Participants were 13–14 years old at t1, 15–16 years old at t2, and 20–21 years old at t3.

To obtain information about a possible drop-out bias, it was investigated if the longitudinal sample had different means at t1 in the key variables as compared to the whole t1 sample. Standardized differences (effect sizes) were computed for the 3 eating problem variables, for self-esteem, and for unstable self-perceptions. This was done the following way: For each comparison we computed the difference between the mean for the longitudinal sample and the mean for the whole t1 sample divided by the SD for the whole t1 sample. We regarded 0.20 as to be a small, 0.50 as a medium, and 0.80 as a large effect size. The largest difference was found for bulimic tendencies. However, this effect size was small (0.05). All other effect sizes were smaller (the mean of all differences being 0.03).

Variables

The Eating Attitudes Test, 12-item version (EAT-12; Garner *et al*., 1982), revised in Norwegian by Lavik *et al*. (1991), was used to measure eating problems. It is a self-report questionnaire with a 4-point rating format for each item ranging from *never* (coded "0") via *seldom* (coded "0") and *often* (coded "1") to *always* (coded "2"). The EAT-12 consists of 3 subscales as mentioned above: Restriction, Bulimia-food preoccupation,

and Diet. A global measure of eating problems was also constructed by summing the scores over the 3 factors for each individual. The internal consistency at t1, measured by Cronbach's alpha, was 0.70 for the whole scale, 0.42 for the Restriction Subscale, 0.58 for the Bulimia-Food Preoccupation Subscale, and 0.74 for the Diet Subscale. The EAT-12 has shown good construct validity when validated against the Bulimic Investigatory Test, Edinburg (BITE; Henderson and Freeman, 1987; Wichstrøm, 1995a). No information regarding the internal consistencies of the 12-item EAT could be attained from prior studies.

Body dissatisfaction was measured by 4 items resulting from factor analysis of 2 self-report questionnaires (see Kansi *et al*., 2003): The Body Areas Satisfaction Scale (Brown *et al*., 1989) and the Physical Self-Concept Subscale of Harter's Self-perception Profile for Adolescents (Harter, 1988). Both questionnaires were revised in Norwegian by Wichstrøm (1995b). Higher scores indicate higher weight-related body dissatisfaction. The internal consistency of the items was 0.81.

Unstable self-perceptions were measured by Rosenberg's Stability of Self-Scale, New York State version (Rosenberg, 1979), revised in Norwegian by Alsaker and Olweus (1986). Responses to each of the 4 items are given on a 4-point Likert scale with high scores indicating more unstable self-perceptions. Internal consistency at t1 was 0.81, which is almost identical to the one reported by Alsaker and Olweus (1986).

Global self-esteem, the extent one likes oneself as a person, was measured by a revised version of Harter's Self Perception Profile for Adolescents in Norwegian (Harter, 1988; Wichstrøm, 1995b). Responses to the 5 items are given on a 4-point Likert scale. High scores indicate a high level of self-esteem. Internal consistency at t1 was 0.77, which is slightly lower than reported by Harter (1988).

Perceived obesity was measured by 1 item: "How would you characterize yourself?" Participants reported their answers on a 5-point scale ranging from *very thin* (1) to *very obese* (5).

Body Mass Index (BMI; Garrow and Webster, 1985), calculated as weight in kilograms divided by the squared height in meters, was assessed by self-report. Errors in self-reported weight have not been found to be related to disordered eating (e.g., Doll and Fairburn, 1998), although among healthy adult samples, heavier individuals have been found to under report their weight and exaggerate their height (Ziebland *et al*., 1996).

Thus, totally 10 variables were included in the analyses: age, Restriction, Bulimia-food preoccupation, Diet, global EAT-score, global self-esteem, unstable self-perceptions, body dissatisfaction, perceived obesity, and body mass index.

Statistical Analyses

Two-tailed paired sample *t*-tests were used to test age differences between means and simple/partial Pearson correlations were used as measures of relationships.

To identify typical patterns of eating problems at each age, cluster analysis using Ward's hierarchical method was performed. Three variables were included in the value profile: Restriction, Bulimia-food preoccupation, and Diet. The analyses were performed on standardized data. The quality of the obtained cluster solutions was measured by the explained error sum of squares (EESS) i.e., the percentage of the variation in the studied variables accounted for by the chosen cluster solution. The LICUR rationale for choosing a suitable number of clusters was used: (1) the EESS should preferably be above 67%, (2) a sudden drop in the EESS should be observed when a cluster solution with 1 cluster less than the optimal number of clusters is chosen, (3) the cluster solution should be theoretically meaningful, and (4) the number of optimal clusters usually varies between 5 and 15 (Bergman, 1998). In the analyses, the statistical package SLEIPNER was used (Bergman and El-Khouri, 1998). This package also allows for testing if the obtained cluster structure is significantly better than could have been expected under a null hypothesis of no structure (a procedure somewhat similar to the significance testing of a correlation coefficient). The homogeneity of each cluster was evaluated by the homogeneity coefficient, which, for standardized data, is often interpreted as satisfactory when below 1.00, but as clearly unsatisfactory when approaching 2.00.

Structural stability and change of the typical syndromes we found were studied by comparing between ages the different clusters' means for the 3 eating problems. Each cluster mean profile (=centroid) at t1 was matched with the best-fitting cluster mean profile at t2 and t3, respectively. The similarity of the cluster mean profiles across time points was calculated as the averaged squared Euclidean distance (ASED) between cluster mean profiles at t1 to those at t2 and t3, respectively. The cluster pairs that had the smallest distances were matched. Individual stability and change were studied by cross-tabulation of cluster membership between t1 and t3. It was then looked for types i.e., cells consisting of combinations of cluster memberships occurring more frequently than expected by chance. Types were tested using the exact hypergeometric probability for each cell computed by the EXACON program (Bergman and El-Khouri, 1998).

Table I. Means, SDs, and Paired *t*-tests Between Age Groups on the Eating Problem Variables and the Risk Factors ($n = 623$)

	Age 13–14		Age 15–16		Age 20–21		Age 13–14 versus Age 15–16	Age 15–16 versus Age 20–21
	M	SD	*M*	SD	*M*	SD	*t*	*t*
RES	0.69	1.01	0.77	1.08	0.59	0.90	*ns*	3.67***
BUL-FP	0.34	0.85	0.54	1.04	0.38	1.00	−4.40***	3.16**
DIET	1.18	1.63	1.61	1.91	1.67	1.89	−6.35***	*ns*
GLO	2.21	2.32	2.96	2.92	2.65	2.75	−6.66***	2.06*
SE-ES	2.78	0.55	2.76	0.58	2.85	0.53	*ns*	−3.92***
UNSP	2.78	0.59	2.78	0.60	2.59	0.72	*ns*	6.00***
PO	2.98	0.72	2.99	0.73	2.98	0.64	*ns*	*ns*
BOD	11.12	2.41	11.26	2.50	11.48	2.33	*ns*	−2.11*
BMI	19.12	2.43	20.07	2.54	22.28	3.40	−13.72***	−21.37***

Note. RES: EAT-Restriction Subscale, BUL-FP: EAT-Bulimia-Food Preoccupation Subscale, DIET: EAT-Diet Subscale, GLO: Global EAT-Score, SE-ES: Self-esteem, UNSP: Unstable self-perceptions, PO: Perceived obesity, BOD: Body dissatisfaction, BMI: Body mass index.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ using a two-tailed *t* -test of the mean differences between two paired samples.

RESULTS

Mean Levels Across Ages for Eating Problems and the Risk Factors

As background information, Table I presents the means and SDs for the age groups on the eating problem variables and the risk factors. For instance, it is seen in Table I that restrictive and bulimic tendencies are highest at ages 15–16 and that Diet scores increase between the ages 13–14 and 15–16.

Stability Coefficients for Different Eating Problems and Risk Factors

Table II presents the stability coefficients (Pearson correlation coefficients) for each eating problem variable and risk factor over 2, 5, and 7 years, respectively. As expected, all correlations decreased with an increased time span.

Regarding the stability of eating problems, the Diet Scale showed the highest stability for all time periods, whereas the Bulimia-Food Preoccupation Scale showed the lowest. The largest decline in stability as the time span increased was found for the Restriction Scale, while the Bulimia-Food Preoccupation Scale declined the least. Regarding the stability of risk factors, Table II shows that BMI demonstrated the highest stability over time, whereas the lowest stability was found for unstable self-perceptions. The largest decline as the time span increased was found for unstable self-perceptions, whereas the smallest decline was found for BMI.

Longitudinal Correlations Between Eating Problem Symptoms and Risk Factors

Table III presents the longitudinal correlations between the risk factors and the 3 different eating problem symptoms. Over all time spans, the strongest correlations were found between body dissatisfaction, perceived obesity and BMI on the one hand, and the Diet Scale on

Table II. Stability Coefficients for Eating Problems and Risk Factors Over 2, 5, and 7 Years, Respectively ($n = 623$)

	Eating problems				Risk factors				
Time period	RES	B-FP	DIET	GLO	SE-ES	UNSP	PO	BOD	BMI
Time 1–Time 2 (2 yrs)	0.48	0.25	0.56	0.50	0.52	0.33	0.64	0.51	0.75
Time 2–Time 3 (5 yrs)	0.29	0.24	0.42	0.34	0.41	0.24	0.55	0.44	0.69
Time 1–Time 3 (7 yrs)	0.24	0.14	0.32	0.28	0.25	0.10	0.49	0.43	0.59

Note. RES: EAT-Restriction Subscale, B-FP: EAT-Bulimia-Food Preoccupation Subscale, DIET: EAT-Diet Subscale, GLO: Global EAT-Score, SE-ES: Self-esteem, UNSP: Unstable self-perceptions, PO: Perceived obesity, BOD: Body dissatisfaction, BMI: Body mass index. All reported correlations are significant at the alpha level of 0.001 except the stability coefficient for unstable self-perceptions over 7 years which was significant at the alpha level of 0.05.

Table III. Longitudinal Correlations Between Risk Factors and the Eating Problem Variables ($n = 623$)

	Age 13–14 versus Age 15–16				Age 15–16 versus Age 20–21				Age 13–14 versus Age 20–21			
	RES	B-FP	DIET	GLO	RES	B-FP	DIET	GLO	RES	B-FP	DIET	GLO
1. SE-ES	—	−0.14***	−0.21***	−0.21***	—	−0.16***	−0.16***	−0.19***	−0.10**	—	−0.11**	−0.13**
2. UNSP	—	0.11**	0.14***	.16***	—	—	0.11**	0.11***	—	—	—	—
3. PO	−0.15***	0.19***	0.35***	0.24***	−0.15***	0.09*	0.24***	0.15***	−0.12**	0.11**	0.25***	0.17***
4. BOD	−0.10*	0.14***	0.33***	.23***	—	0.11**	0.22***	0.18***	—	0.17***	0.26***	0.23***
5. BMI	−0.21***	0.09*	0.31***	0.16***	−0.15***	—	0.23***	0.13**	−0.14***	0.10*	0.27***	0.17***

Note. RES: EAT-Restriction Subscale, B-FP: EAT-Bulimia-Food Preoccupation Subscale, DIET: EAT-Diet Subscale, GLO: Global EAT-Score, SE-ES: Self-esteem, UNSP: Unstable self-perceptions, PO: Perceived obesity, BOD: Body dissatisfaction, BMI: Body mass index.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; non-significant correlations are marked with a dash.

the other. These relationships were positive, although not strong, not even across 2 years (the explained variance is about 11%). As expected, the relationships decreased when the time span increased beyond 2 years.

Typical Patterns of Eating Problems

Cluster Analysis of Eating Problems

A hierarchical cluster analysis using Ward's method was conducted. Before performing the analyses and at each age separately, all eating problem variables were transformed to *z*-scores and a constant of 3 was added to avoid negative numbers. Using the 4 criteria previously described, an 8-cluster solution was chosen at each time point. The EESS was 79% for the cluster analysis in t1, 76% in t2, and 81% in t3, respectively. Hence, the explained error sums of squares were satisfactory, indicating that reasonably homogeneous clusters had been obtained. All clusters, except Cluster 6, had acceptable homogeneities varying between 0.03 and 2.30 and a median of 0.60. Both the level and the form of the profile will be taken into account in the interpretations.

Figure 1 presents a graphical illustration of the centroid profiles at t1, t2, and t3, respectively, resulting from cluster analyses of the 3 eating problem variables. Clusters 1 and 2, named *No problem group A and B*, respectively, were similar in that relatively low scores on all of the EAT-12 variables characterized both. Girls in Cluster 3, named *Mild bulimic symptoms*, were generally characterized by low scores on the Restriction and Diet Scales in combination with slightly elevated bulimic symptoms. Girls in Cluster 4, named *Dieting only*, had below average scores on restrictive and bulimic symptoms and above average scores on the Diet Scale. Girls in Cluster 5, named *Restrictive symptoms*, had high scores on the Restriction Scale in combination with low scores on the Bulimia-food preoccupation and Diet Scales. Girls in Cluster 6, named *Pronounced bulimic symptoms and dieting*, had relatively low scores on restrictive symptoms, but very high scores on the Bulimia-Food Preoccupation Scale. The dieting level in this cluster varied between ages with a higher level at higher ages. Girls in Cluster 7, named *Mild bulimic symptoms and dieting*, were characterized by average scores on the Restriction Scale and simultaneously elevated scores on the Bulimia-Food Preoccupation and Diet Scales. Girls in Cluster 8, named *Mixed symptoms*, was heterogeneous between ages and varied both in the type and level of symptoms over 7 years.

To conclude, one cluster with pronounced eating problems was found: Cluster 6 was characterized by average scores on the Restriction Scale, very high scores on the Bulimia-food preoccupation, and increased Diet level.

Structural Stability of Typical Eating Problem Patterns

The average squared Euclidian distance (ASED) of the cluster means at t2 and t3, respectively, from the closest cluster at t1 indicated that Clusters 1–7 were structurally rather stable over a period of 7 years (ASED varying between 0.003 and 1.10). Thus, eating problem symptoms seemed to combine together in the same manner in these clusters, at different ages. All of these clusters also had approximately the same problem level over the period of 7 years. In contrast, Cluster 8 was heterogeneous (*Mdn* ASED 2.30) and it had a poor similarity across age being characterized by structural change over a 7-year period (ASED 3.665). In this cluster, change occurred in both the type of and the severity of eating problems.

The number of girls in Clusters 1 and 7 were approximately the same over 7 years. The sizes of Clusters 2, 6,

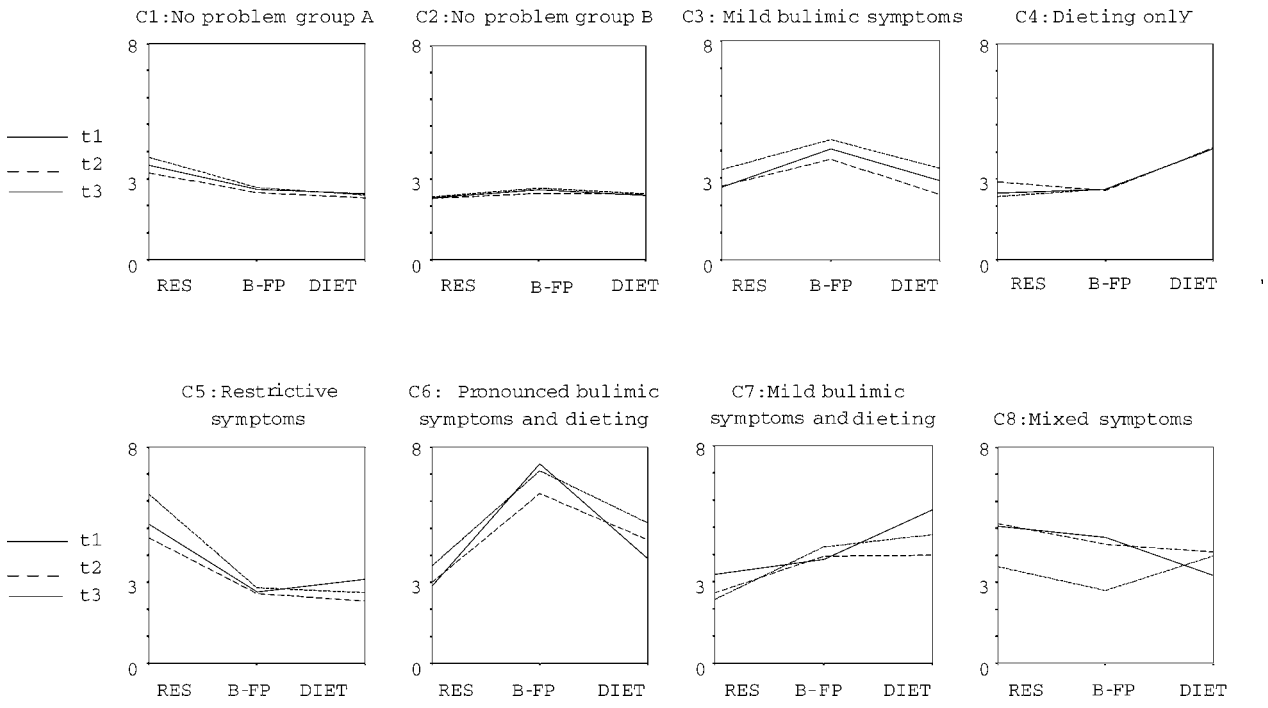

Fig. 1. Graphical presentation of the cluster mean profiles (centroids) of the 8-cluster solutions from t1 to t3. All variables are presented as *z*-scores with an added constant of 3 ($M = 3$, SD $= 1$; $n = 623$). *Note*. RES: EAT-Restriction Scale, B-FP: EAT-Bulimia-Food Preoccupation Scale, and DIET: EAT-Diet Scale.

and 8 increased slightly, whereas the sizes of Cluster 3, 4, and 5 decreased.

Individual Stability of Typical Eating Problem Patterns

Figure 2 presents a graphical illustration of individual stability and change of eating problem syndromes over a 7-year period. For every significant longitudinal stream, the ratio of the observed to expected frequency is indicated. For instance, to start in Cluster 1 at ages 13–14 and end up in Cluster 1 in ages 20–21 occurs significantly more frequently than expected by chance. The overrepresentation of this longitudinal stream is 1.49. It is seen that Clusters 1, 2, 4, 5, and 7 showed significant individual stability over 7 years. No individual stability was found for Cluster 3 (mild bulimic symptoms), Cluster 6 (pronounced bulimic symptoms and dieting), or Cluster 8 (mixed symptoms).

Finally, some interesting tendencies were found regarding individual change over 7 years (alpha level not corrected for mass significance): Girls in Cluster 3 tended to move to Cluster 6, and girls in Cluster 6 tended to move to Cluster 8.

Is a Problematic Self-Concept Related to Multiple Eating Problems?

It was hypothesized that being high in unstable self-perceptions in combination with being low on self-esteem would be a strong risk factor for exhibiting eating problems. This hypothesis was tested and the results are presented here. At each age, the level of global self-esteem and unstable self-perceptions, respectively, were trichotomized (low, average, high) and the 9 different possible value combinations were formed. These were linked by cross-tabulation to the 8 eating problem clusters in order to search for significant types. Especially it was expected that belonging to the highest 3rd of unstable self-perceptions and the lowest 3rd on self-esteem would be linked to belonging to Cluster 6 (Pronounced bulimic symptoms and dieting). At ages 13–14, girls in Cluster 6 belonged 2.15 times more often than would be expected by chance to the highest 3rd on unstable self-perceptions and simultaneously to the lowest 3rd on self-esteem. Corresponding numbers at ages 15–16 and 20–21 were 4.91 and 4.15, respectively. The 2 last results are significant at an alpha level of 0.0001. Hence, the hypothesis was confirmed.

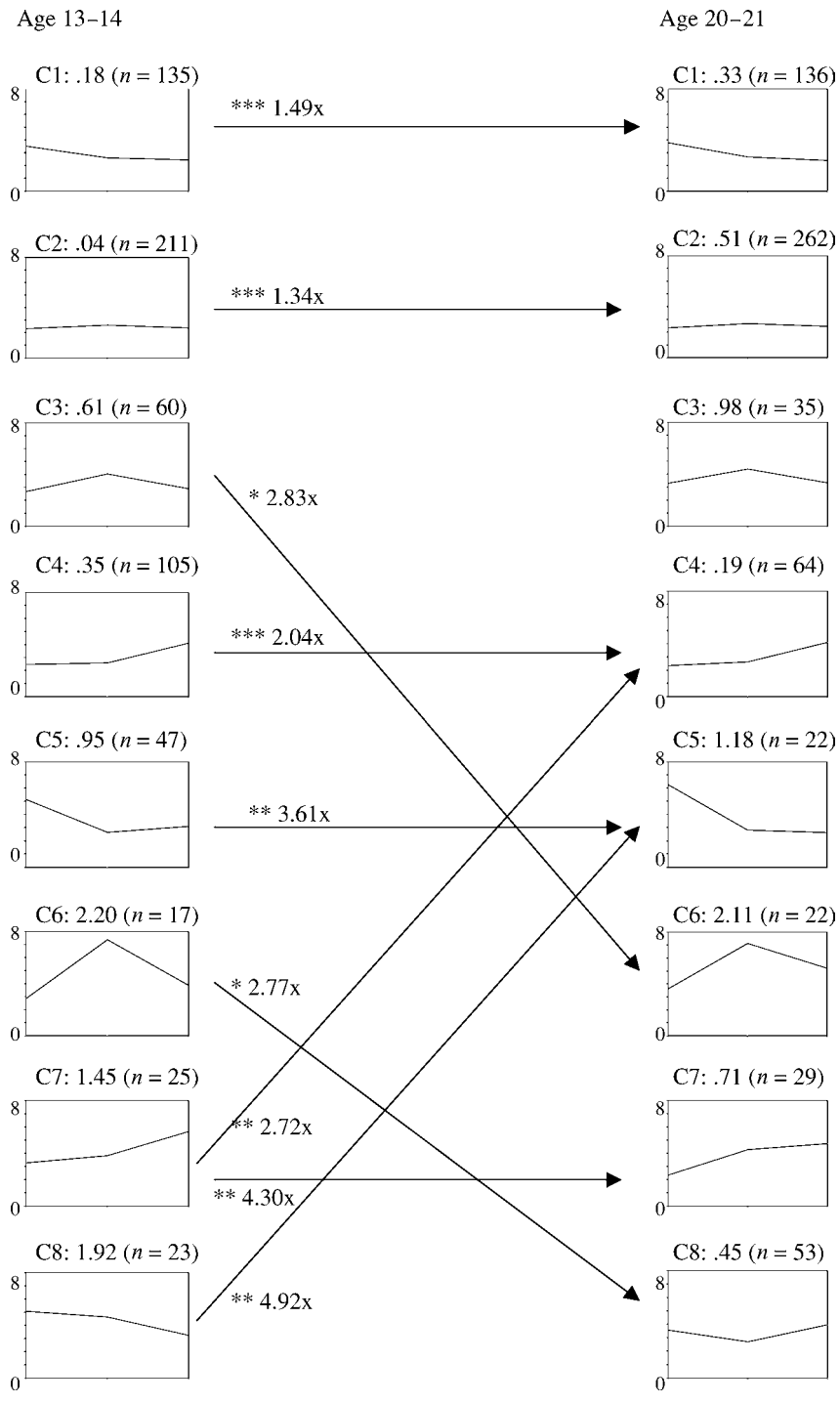

Fig. 2. Graphical presentation of the clusters and of individual stability and change between t1 and t3 ($n = 623$). Homogeneity coefficients and number of individuals in each cluster at each time point are marked above each cluster profile. Only significant streams are marked. All variables are presented as z-scores with an added constant of 3 ($M = 3$, SD $= 1$; $n = 623$). *Note*. For example, 1.49× means that the observed frequency is 1.49 larger than the expected frequency. $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

DISCUSSION

Earlier studies on the longitudinal stability of eating problem symptoms have mainly used a global score as a measure of eating problems (e.g., Attie and Brooks-Gunn, 1989). Obviously, by summing up the scores from different eating problem symptoms, information may be lost because 2 individuals with the same total score may have different combinations of the specific eating problem symptoms. Further, the few studies that have investigated different eating problem symptoms have not been conducted with representative population samples (e.g., Fitzgibbon *et al*., 2003). For these reasons, we wanted to extend our knowledge of the stability of eating problems by investigating separately 3 different eating problem symptoms: restrictive tendencies, bulimic tendencies, and dieting behavior. This was done for a representative population sample.

Our results, based on a longitudinal sample, showed the mean changes in the different eating problem symptom variables over 7 years to be small. Bulimic tendencies had the highest mean at ages 15–16 years, although the differences to the other ages were not large (around 0.2 SD units). These results suggest that the levels of all 3 types of eating problems do not change much from adolescence to early adulthood. Dieting behavior had the highest correlational stability (0.32 over 7 years) and the oldest girls, aged 20–21, showed the highest levels (the mean increase over 7 years was 0.27 SD units). Considering that the level of dieting among the girls aged 20–21 in the present sample was the same as found by Kansi *et al*. (2003) among 17–19-year-old girls, the results suggest that dieting, as opposed to restrictive and bulimic tendencies, does not decrease as girls get older. This is in contrast to findings that found dieting to peak around the age of 18 (e.g., Schleimer, 1983). Regarding the 2-year stability of the total eating problem load, our results are compatible to those found by Attie and Brooks-Gunn (1989).

We investigated if eating problem symptoms would combine into syndromes in a different way in adolescence compared to early adulthood. Also, we wanted to know if it was common or uncommon for girls to remain in the same eating problem syndrome group over time. We found that all the typical syndromes but one were structurally rather stable over 7 years, indicating that there did not seem to be large differences in how eating problems presented themselves in adolescence and adulthood, respectively; for example, at all ages we found an eating problem cluster characterized by Pronounced bulimic symptoms and dieting. One difference we found was that belonging to the Restrictive symptoms group became increasingly uncommon as girls became older.

It is noteworthy that we could not establish *individual* stability for belonging to the *structurally* stable Pronounced bulimic symptoms and dieting group. This finding indicates that somewhat different individuals made up this cluster at different time points. Thus, although we did not find a single group of girls characterized by chronic eating problems all the time from adolescence to early adulthood, the number of girls showing high levels of bulimic symptoms and dieting was approximately the same at each time point. One possible explanation for this lack of individual stability is that, because of their strong symptoms, these girls seek professional help. Therefore they have lower problem levels at higher ages. Unfortunately, we do not have the data to test this hypothesis. Generally, it was the girls with low levels of eating problems that showed the highest individual stability. Thus, it seems that girls who in adolescence have no or only mild eating problems symptoms are very likely to stay that way and only rarely develop more serious eating problems in their twenties. This characterized only 4 girls as compared to the expected 12.2 girls, $p < 0.001$.

Over 7 years, the risk variables had rather low associations with the eating problem symptoms. Looking at the associations between low self-esteem and eating problem symptoms, we found no consistent or strong relationships. Thus, the results of our representative sample are in contrast to the findings within eating disorders (Fairburn *et al*., 1999), but confirm the results regarding eating problems (Gardner *et al*., 2000; Leon *et al*., 1995).

Our results failed to find support for the suggestion that an insecure identity, measured as unstable self-perceptions, would be a risk factor for later disordered eating (e.g., Bruch, 1973; Striegel-Moore, 1993). However, our cross-sectional results showed a clear association between pronounced bulimic symptoms and dieting syndrome on the one hand, and low self-esteem in combination with unstable self-perceptions, on the other. This indicates the possibility that bulimic tendencies and dieting could make an individual susceptible to develop low self-esteem and unstable self-perceptions. If one's self-worth to a high degree is defined according to the perceived success of dietary restraint, not succeeding in losing weight could lead to lowered self-esteem and perceptions of failure, and consequently, fluctuating self-perceptions.

We found only limited support for the proposition that milder eating problems could accelerate into more serious eating disorders. However, when we compared our results regarding eating problem syndromes to those found concerning eating disorders, interesting similarities were revealed between the Pronounced bulimic symptoms and dieting cluster and clinical descriptions of Bulimia Nervosa regarding the way how the eating

problem symptoms were combined together (American Psychiatric Association, 1994; Fairburn, 1997).

Restrictive tendencies became less common as the girls grew older, being in line with findings stating AN to peak by the age of 18 (American Psychiatric Association, 1994). Nevertheless, we failed to find a group of girls that on a syndrome level resembled the clinical descriptions of AN. Surely, it would have been tempting to suggest the Restrictive symptoms group at ages 20–21 to be indicative of AN, but it should be noted that these girls did not differ from their peers in body dissatisfaction—one of the core traits of the eating disorder.

In the Results section, a large number of significant tests were made. For many of them we have clear hypotheses of what results to expect, but many of the analyses are more explorative. This raises the question of increases in error rates in our reported results and whether corrections for the mass significance problem should be made. Because we have a large sample, the power of the tests undertaken is high and a noteworthy finding should result in a strongly significant result. Therefore, we chose the strategy of only relying on results significant at the $p < 0.001$ level in the explorative analyses as a simple way of reducing the mass significance problem.

The reader used to variable-oriented analyses might wonder why we only did some basic analyses along these lines and then switched to person-oriented analyses. It is true that more advanced variable-oriented analyses, for instance, using structural equation modeling (SEM), would be likely to give valuable additional insights. However, we considered it even more important to obtain information about the formation of eating problems into syndromes and how they change with age, both structurally in terms of what typical patterns of problems are found and individually in terms of individuals' stable and changing patterns of eating problems. To do both kinds of analysis in a single paper would lengthen it considerably and bring it out of format. We believe that the chosen analytical strategy gives both basic information and a first insight in the process of eating problems as it relates to emerging typical syndromes. For a further discussion of this issue, the reader is referred to Bergman (2001). An interesting follow-up study of this one would be to formulate our findings into a developmental model that can be tested using longitudinal SEM methodology, although it would be difficult to create the necessary multiple indicators to take the interactions components of the model into account.

To conclude, in contrast to only studying changes in eating problems as reflected in a total scale score, the present paper has hopefully demonstrated the usefulness of studying eating problem dimensions separately, using both a variable-oriented and a person-oriented approach. Our results offer a starting point for future research in at least 2 aspects. First, the lack of individual stability for the Pronounced bulimic symptoms and dieting syndrome group is a puzzling result meriting further study. Secondly, in order to test the continuity hypothesis, it would be interesting to study typical eating problem syndromes for a clinical population and compare these findings to the results we found for a normal population.

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