

RISK TEST FOR EATING DISORDERS: FACTOR ANALYTIC STUDY

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Abstract

Objective: Eating disorders (ED) are disabling, unpredictable, and difficult to treat. The high percentage of false negatives at screening test indicates that up to now the prevalence of ED in adolescents could have been underestimated.

The aim of the study was to evaluate the Factor structure of "Risk Test" (RT), a 16-item questionnaire recommended by Italian Government for screening young people to assess the risk for ED by studying their behaviour style and emotional/affective involvement related to eating attitudes and the need to apply the RT in a non clinical context.

Method: 422 students, between 16 and 32 years, were assessed using RT. All participants spoke Italian as their mother-tongue or were fluent in Italian.

Results: An exploratory Factor Analysis was used in order to generate hypotheses about underlying processes measured by the instrument. A five factor solution was generated by the analysis, accounting for 69.7% of the total variance.

Conclusions: The RT was well accepted by the patients and needed very little supervision by the interviewer. Our data suggests the importance of the dimensions evaluation of RT ("Fear-emotional-impulsive factor", "Behavioural factor", "Physical and mood disruption", "Safe" and "Unsafe attitude"). The factor structure of the RT is consistent with the underlining cognitive structure of disturbed eating behaviour which is able to be treated with a preventive, cognitively oriented psychological approach.

Key Words: Risk Test, eating disorders, psychometric properties, factor analysis, cognitive approach

Declaration of interest: none

Abbreviations: ED: eating disorders, RT: risk test

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Introduction

Eating disorders (ED) are disabling, unpredictable, and difficult to treat (Ben-Tovim et al. 2001). The prevalence is higher among females, is characterised by chronicity and relapse, impairment of psychosocial functioning and associated with elevated risk for suicide (Fairburn et al. 2000, Lewinsohn et al. 2000, Newman et al. 1996). The Prevalence of ED in adolescents (3.71%) and high percentage of false negatives both indicate that up to now the prevalence of ED in adolescents could be underestimated (Rodriguez-Cano et al. 2005, Masheb and Grilo 2000).

Therapeutic guidelines suggest the need to focus treatment directly on factors, such as hopelessness and

depression, as well as implementing standard procedures to ensure clients are able to engage in therapy (NICE 2004, Stice et al. 2007).

Interventionists typically seek to reduce established risk factors for eating pathology based on the logic that this should decrease current and future eating disturbances. In a recent review, Stice et al. (2007) focus on risk factors that have been supported by multiple prospective studies conducted by independent research groups.

Elevated perceived pressure to be thin from family, peers, and the media, the internalisation of the thin-ideal espoused for women by western culture, body mass, body dissatisfaction and the consequence of negative attitudes have led to future eating pathology in

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multiple studies (e.g.: Field et al. 1999, Killen et al. 1996, Stice 2001, Wertheim et al. 2001, Wichstrom 2000).

Randomised experiments have found interventions that reduce thin-ideal internalisation, body dissatisfaction, and the effect of negative attitudes result in consequent reductions in eating disorder symptoms (Bearman et al. 2003, Burton et al. 2007, Rosen et al. 1995), providing evidence that these may be causal risk factors.

Although dieting has predicted future eating pathology in multiple prospective studies (Field et al. 1999, Killen et al. 1996), experiments have found that assignment to a low-calorie weight-loss diet versus a waitlist control condition, results in decreased bulimic symptoms in normal weight young women, overweight women, obese binge-eating women, and women with threshold and sub threshold bulimia nervosa (Burton and Stice 2006, Goodrick et al. 1998, Klem et al. 1997). Unfortunately, we know little about risk factors specific to anorexia nervosa, bulimia nervosa, or binge eating disorder because the prospective studies used invalid measures of dietary restraint (Stice et al. 2007).

The risk factor is a variable that has been shown to indicate some possible subsequent pathological outcome. The use of the scale of eating attitudes should help health professionals to identify subjects at risk for eating disturbances and provide the opportunity for intervention (Wilson 1999, Ruggeri et al. 2000, Johnson and Bedford 2004, Taylor et al. 2006). The National Health Programme recommended preventive strategies for eating disorders, stating they should be a priority for the adolescent.

The aim of this study is to evaluate the Factor Structure of "Risk Test" (RT), a 16-item questionnaire recommended by Italian Government for screening purposes on young people which assesses the risk for eating disorders by gathering data on behaviour style and emotional/affective involvement related to eating attitudes in a large heterogeneous population of young students. We hypothesise that there is the need to apply the RT in a non clinical context to individuals at risk of ED and to those with the possible presence of premorbid conditions.

Method

Design and measures assessment

The "Risk Test" is a screening instrument, recommended by The Italian Ministry of Health (number 206, may, 15 2001) for the prevention of Eating Disorders, assessing several domains of behaviour style and emotional/affective involvement related to eating attitudes (**table 1** and **2**).

Participants

All the participants (n=422) were undergraduates of the University of L'Aquila and students attending the secondary school from the same town. Sample size was calculated using Floyd and Widaman's suggestion of 5:1 ratio of participants to variables for exploratory factor analysis. With 15 items, a minimum of 75

participants was needed for this study. Individuals agreed to participate in the validation study and they also discussed their individual test results with their tutor. The study was conducted in 2005.

Descriptive characteristics

Ages of population ranged from 16 to 32 years (M=24.64; SD: 6.82). The participants were not equally divided between male (N=112; 26.5%) and female (N=310; 73.5%).

Data analysis

The Statistical Package Social Sciences (SPSS) version 13.0 (Nourusis 1999) was used for data analysis which began with descriptive statistics of demographic variables. To estimate each instrument's reliability, Cronbach's alpha was used. To assess the construct validity of the "Risk test", exploratory factor analysis was used. To determine the appropriateness of factor analysis, Kaiser's measure of sampling adequacy was examined. The result showed that sampling adequacy (KMO) was 0.626, supporting adequate data for factor analysis. The Bartlett's Test of Sphericity, a test for overall significance of correlations within a matrix, was statistically significant ($p < 0.001$; Approx. Chi-Square 286.26) supporting the use of factor analysis. Principal component analysis was used to create the factors with an orthogonal varimax rotation, which is most commonly used in exploratory factor analysis. In this study, the factor loading criterion was set at $e \geq 0.50$ the cut-off criterion of eigenvalue > 1 was used to select the numbers of factor. The scree plot was also examined to eliminate any factor in the elongated tail. Question 1: "Is your BMI index less than 18.5?" was excluded from factor analysis because the BMI index was calculated on an individual basis.

An exploratory Factor Analysis was used in order to generate hypotheses about the underlying processes which had been measured by the instrument (Tabachnick and Fidell, 2001). No point was unanswered apart from questions overtly focused on females characteristics (item nine).

Results

Construct validity, score distribution and internal consistency reliability of the "Risk test"

Factor analysis was used to test the construct validity of the "Risk Test" (**table 1**). A principal component extraction method was applied. Then the obtained factors were rotated orthogonally using the varimax method. In this study, the factor loading criterion was set at more than 0.50 and all 15 items were included. Five factors with eigenvalues > 1 were extracted, accounting for 56.96% of the variance. Additional factors were in the descending portion of the screen plot, but were not included because of their low eigenvalues.

Dimensional structure

Individually, the amount of variance (after varimax rotation) accounted by factor 1 through 5 were (eigenvalues in parentheses) 21.42% (3.2), 10.12% (1.5), 9.52% (1.4), 7.55% (1.1), 7.08% (1.0). The pattern matrix of this solution is presented in **table 1**.

We decided to retain all five factors for varimax rotation, because they were meaningful and conceptually interpretable.

The examination of the factors led to the identification of a **first** dimension (21.42 % variance) including 5 items (2, 5, 6, 10, 15). This factor consists mainly of items intended to assess the fear of increasing weight, the sense of guilt after eating and thought focused obsessively on food, this is the “Fear-emotional-impulsive factor”.

The **second** dimension (10.12 % variance) included items: 4, 11 and 12 (items were related to binge and restrictive behaviours) and is considered a “Behavioural factor” characterised by inadequate actions to control weight.

The **third** dimension (9.52 % variance) was defined by items 7, 8 and 9. In our view, this dimension described a sort of “Physical and mood disruption” in which responses were focused on endocrinological and physical consequences of food restriction.

The **fourth** dimension (7.55 % variance) included 2 items (3, 14) that focused on a “safe” attitude toward weight and body control, physical activity and weight control.

The **fifth** dimension (7.08 % variance) included two items (13,16) which were focused on two dysfunctional or “unsafe” behaviours: the use of diuretic or laxative drugs and a reluctance to discuss with others personal problems related to eating behaviour (items 13 and 16).

Multitrait analysis demonstrated that all items achieved the convergent validity criterion (correlation coefficient of the item with its own domain e 0.52).

Table 2 presents score distribution, ceiling and floor effect and internal consistency reliability results. The Cronbach’s α coefficient of the questionnaire is 0.677 (Chi-square: 411.44).

Gender difference was statistically significant in the first 3 factors (“Fear-emotional-impulsive factor”, “Behavioural factor” and “Physical and mood disruption”) and the total score of the RT (see **table 3**).

Discussion

The total score is weighted significantly by factors 1 and 2; this is probably related to the psychometric variance explained by these factors.

In the recent review, Stice et al. (2007) found that 51% of ED prevention programmes reduced eating disorder risk factors and that 29% reduced current or future eating pathology. Our data suggests the importance of the dimension for the validity of the RT and its factor structure for a cognitive oriented approach treatment. In fact the psycho educational interventions are less effective than interventions that actively engage participants and teach new skills (Larimer & Crouce 2002). The clinicians revealed that the majority of the cases with illness that arrive at the point of being under specialists care have an increase in comorbid psychiatric disorders, an early onset of symptoms, an increase of male characteristics over a longer period of untreated symptoms and an increased likelihood of an invite a referral to specialists for the cure of late ED, these patients, then, also have an increased risk of drop-out and inappropriate care.

We posit that an interactive format helps

Table 1. Risk Test pattern matrix. The “Risk Test” seems to be interesting because of its shortness, ease of administration and rating and therefore could be useful in clinical practice and research

Item (RT) and Total Score		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1.	BMI < 18.5					
2.	Fear of weight increase	0.599				
3.	Weight check				0.547	
4.	Concern about calories food		0.570			
5.	Sense of guilt about eating	0.662				
6.	Concern about body shape	0.522				
7.	Weight influencing mood			0.632		
8.	Weight influencing social relationship			0.709		
9.	Irregular /absence menstruation			0.698		
10.	Loss of control in eating	0.569				
11.	Self-induced vomiting after eating		0.517			
12.	Restrained diets		0.638			
13.	Methods to regulate weight (laxative, diuretic or drug)					0.540
14.	Methods to regulate weight, like use of physical exercise				0.597	
15.	Food obsession	0.504				
16.	Someone to talk about the problem					0.827

Table 2. Score distribution, ceiling and floor effects and internal reliability of the RT

	Number of items	Score			Ceiling effect %	Floor effect %	Cronbach's α coefficient if item deleted
		N	Mean	SD			
Factor 1	5 items	422	0.97	1.18	0.5	46.1	0.530
Factor 2	3 items	422	0.96	0.94	4	42.3	0.597
Factor 3	3 items	422	0.36	0.68	1.4	74.7	0.593
Factor 4	2 items	422	0.28	0.53	4	75.2	0.657
Factor 5	2 items	422	0.13	0.64	0.2	89.6	0.699

Table 3. Independent *t* test for gender difference in RT

	t	df	p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Factor 1	-3,22	419	0,00	-0,41	0,13	-0,67	-0,16
Factor 2	-2,56	419	0,01	-0,26	0,10	-0,47	-0,06
Factor 3	-2,75	419	0,01	-0,21	0,07	-0,35	-0,06
Factor 4	-0,25	419	0,81	-0,01	0,06	-0,13	0,10
Factor 5	-0,77	419	0,44	-0,05	0,07	-0,19	0,08
Total Score	-3,19	419	0,00	-0,95	0,30	-1,54	-0,37

participants engage in the specific programme, which probably facilitates the acquisition of concepts and promotes attitudinal and behavioural change.

There is evidence that interventions focusing on body acceptance are more effective than programmes without this focus. That effect may be explained by the emotional distress of such people. Emotional distress increases the risk of a variety of problems, including unhealthy dieting, negative effects, and eating-disordered behaviour (e.g., vomiting for weight control) and a reduction in body dissatisfaction results in decreases in these downstream disturbances. Programmes with dissonance-induction content designed to reduce thin-ideal internalisation produced larger effects for thin-ideal internalisation, body dissatisfaction, dieting, negative effect, and eating pathology than did programmes without that content, providing support for the effectiveness of this attitudinal change approach.

The RT was well accepted by the patients and required very little supervision by the professionals and our data suggests the importance of evaluation of subjects in non-medical settings.

The findings indicate it may be beneficial to intervene in a targeted population with programmes oriented toward prevention of ED.

A number of positive developments have occurred in the ED prevention field. First, the identification of a risk factor (e.g. evaluation of the RT dimension: "Fear-emotional-impulsive factor") has been found to indicate the need for active and specific interventions.

Select prevention programmes have shown positive intervention effects for both eating pathology and

obesity which is desirable because programmes that impact on multiple public health problems are more advantageous from a dissemination perspective than those that just impact on a single problem.

The evaluation of RT dimension: "Behavioural factor", characterised by inadequate actions to control weight, has been found to allow for a specific, active programme of intervention and a greater understanding of the problem.

There are also several areas of concern regarding the eating disorder prevention literature: One suggests that it will be vital to explore methods of producing larger and more persistent effects in ED or obesity. It is our impression that greater use of persuasion principles from social psychology may prove useful in this regard, but other alternatives should also be explored, such as the use of booster sessions, adjunctive bibliotherapy, or school-wide interventions that challenge unhealthy norms and which focus on the at risk population with an age range of 18-30.

We did not investigate family history for psychiatric disorders in participants and this is a limitation of the study as researchers decided to observe a phenomenon in a sample of a non clinical population. Further studies of a wider sample of the population or further concurrent validating studies could confirm the importance of the use of the factors taken from the RT as they are likely indicators of the patient's increased risk of developing ED.

Few studies have examined the factors that account for intervention effects which are vital for testing the intervention theory specific to each programme and for exploring the effects of nonspecific factors. The fact is

that several interventions did not produce significantly stronger effects than the use of minimal intervention control conditions cf. Celio et al. 2000, Mutterperl and Sanderson 2002, Nicolino et al. 2001, but see also Becker et al. 2006, Rosen et al. 1989. Late interventions, obesity and high drop-out suggest that non specific factors should be examined as potential mediators (Becker et al. 2005, Giosuè et al. 2003). The RT dimensions ("Safe", "Unsafe" and "Physical and mood disruption") leave open the possibility to intervene in this direction facilitating the design of more effective interventions or choosing the most appropriate setting for treatment (Donini et al. 2010). For example, it was noteworthy that three of the interventions that reduced eating disorder symptoms, *increased* dietary restriction and unsafe dimension, a variable that is widely accepted to be a risk factor for eating pathology (Groesz and Stice 2006). These results suggest the need for refinement of one of the most widely accepted aetiological risk factors for eating pathology (Lewinsohn et al. 2000). Virtually all trials have not used placebo or alternative intervention control groups, making it impossible to separate intervention effects from effects arising from nonspecific factors, demand characteristics, or expectancies. Numerous eating disorder prevention trials did not include a measure of eating disorder symptoms or diagnoses which limits what can be learned from these trials. It is also worrisome that many researchers did not test for differential change in outcomes across intervention conditions which is essential for the proper interpretation of intervention effects (Stice et al. 2007, Martiadis et al. 2007).

In conclusion, the RT is a good screening scale for the young adults and the subjects with ED in medical and non medical settings, for assessment and outcomes monitoring.

The assessment of the personal characteristics of the ED risk behaviours is a starting point for planning projects focusing on primary and secondary prevention (Saporetto et al. 2004).

It is important to note that the reported levels of attributable risk overestimate real health gain, because it is unrealistic to expect that a preventive test would be completely successful in risk factor prevention or in completely containing its effect (Stice 2002). The results thus represent upper limits of the possible health gain and need to be treated with caution.

Besides examining the association between risk factors and ED, we demonstrated the significance that these risk factors have for preventive interventions in terms of possible health gain and the likely efficiency of preventive intervention. The results of this study suggest that more attention should be given to persons with high score in "Fear-emotional-impulsive factor" dimension and high score in "Unsafe" dimension and that such people should be re-interviewed with a second line approach to diagnosis, oriented to an early identification. People who suspect they might have an ED may find it difficult or embarrassing to admit to the problem or seek help to talk about their symptoms to a healthcare professional (NICE 2004). The RT is easy to use for both professional and non-professional carers.

Data literature showed that when prevention is effectively directed at early identification of dimension

risk factors, a large proportion of eating disturbances can be indicated and prevented, creating locally relevant services rather than seeking "the right answer" from elsewhere (Thornicroft et al. 2008). This was the intention of the Italian Government when the RT was developed and recommended.

Additional research is needed to elucidate the mediators of intervention effects, which is crucial for testing intervention theories specific to risk and for exploring the effects of nonspecific factors (Stice et al. 2007).

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