



Disordered Eating Pathology and Body Image Among Adolescent Girls in Israel: The Role of Sense of Coherence

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Abstract

Disordered eating pathology (DEP) represents a range of behaviors and attitudes, from negative body image to full blown eating disorders, appearing mainly in adolescent females. DEP is related to a plethora of biological and psychological factors, including various coping strategies. Sense of coherence (SOC) is a coping mechanism defined as an external and internal ability to adapt to stress and has been found to be associated with better mental health outcomes. However, SOC has not been examined in relation to DEP. Therefore, the aim of this study is to examine the relationship between SOC, DEP and body image disturbances among adolescent girls. The sample consisted of 248 Israeli girls (12–18), who completed self-reported questionnaires. SOC was negatively associated with DEP and body dissatisfaction. The overall rate of those in the high risk group for EDs was found to be higher than previously seen among samples from a similar population (22.5% vs. 19.5%), and was found to have a significantly lower levels of SOC and more negative body image than those at lower risk. Greater SOC was found to be associated with lower levels of DEP. It is suggested that strengthening SOC be incorporated into eating disorder prevention and treatment. Results emphasize the importance of SOC to well-being and mental health.

Keywords Disordered eating · Adolescents · Females · Sense of coherence · Body image

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Introduction

An increasing body of research over the last five decades indicates a consistent rise in the prevalence of eating disorders (EDs) (such as anorexia and bulimia nervosa and binge eating disorder) and disordered eating pathology (DEP), especially among female adolescents, in Western society (Smink et al. 2012; Hoek 2016; Udo and Grilo 2018). EDs and DEP describe thoughts and behaviors that reflect serious problems related to body image and body perception.

Disordered eating pathology (DEP) is a non-clinical term which refers to moderate levels of disturbed eating patterns such as preoccupations with weight and shape, body image disturbance and food intake. Caloric restriction, constant dieting, over-exercising and diuretics and laxatives usage are common examples of behavior associated with DEP (Latzer et al. 2015). Those showing signs of DEP are at greater risk developing full-blown EDs if not properly treated, emphasizing the importance of identifying those with DEP who are at risk (Weinberger-Litman et al. 2018). DEP is related to significant psychiatric and physical co-morbidities (Skemp-Arlt 2006; Hudson et al. 2007) Research indicates a high

prevalence of body dissatisfaction among young girls despite being at normal weight (Bucchianeri et al. 2013).

A similar trend of increased DEP has been observed in Israel. A multi-country study of adolescents by the World Health Organization reported that in the last three decades, Israeli youth have been troubled by eating-related disturbances at one of the highest rates of the 34 industrialized nations participating in the study (Harel et al. 2002). Approximately, 20% of Israeli adolescents displayed symptoms of DEP, with the highest rate found among girls aged 16–18 (Latzer and Tzischinsky 2003, 2005; Maor et al. 2006; Greenberg et al. 2007). These alarming rates highlight the need to identify risk and protective factors among the highest risk groups.

Both EDs and DEP are related to a complex interplay of genetic, biological, psychological, familial and socio-cultural factors (Levine and Smolak 2009; Stice et al. 2011; Hilbert et al. 2014). Early adolescence has been identified as a risk period when girls are particularly vulnerable to developing DEP or EDs because of the normative challenges associated with this developmental stage, such as physical changes, increased desire for peer acceptance, social comparison and low self-esteem (Steinberg 2002). Body dissatisfaction and low self-esteem, have consistently been shown to be one of the most proximal risk factors for DEP and is therefore important to explore independently as well as in relation to other symptoms (Stice et al. 2013; Mitchison and Mond 2015).

In recent years, the concept of sense of coherence (SOC), (Antonovsky 1979), has received renewed attention for its role in overall mental and physical health, particularly among adolescents. SOC is defined as the external and internal abilities to change, and cope with stress. According to Antonovsky (1987), an individual's SOC is a significant human resource that can determine mental ability to cope in stressful situations and represents a continuum from healthy to pathological behaviors. SOC also relates to choosing coping styles that are suitable for different situations. An individual's SOC is a significant coping mechanism that will determine how effectively one deals with stressful situations. A person with a high SOC copes appropriately based on the situation (Antonovsky 1987; Hintermair 2004; Eriksson 2007). SOC is innate, dynamic and is fully formed by the age of 30 (Antonovsky 1987).

According to the literature, there is a positive correlation between high SOC and various physical and mental health conditions (Antonovsky 1983; Ebert et al. 2002; Eriksson and Lindström 2006) including overall well-being, better self-esteem and better ability to deal with emotional tension in stressful situations (Wainwright et al. 2008; Binkowska-Bury and Januszewicz 2010). People with low SOC expressed higher levels of anxiety, depression, burn-out, anger and helplessness (Eriksson and Lindström 2006).

These findings are consistently found in both adults and adolescents (Myrin and Lagerstrom 2008).

Furthermore, individuals with higher SOC have demonstrated higher levels of resilience during crisis and have better overall physical health outcomes as well.

However, to the best of our knowledge, this concept has not been widely studied with regard to its association with DEP, body dissatisfaction or eating disorders. It is likely that lower levels of SOC and higher levels psychopathology such as DEP may share core features related to natural developmental trajectories as well as cultural stressors related to adolescence. High rates of DEP observed in adolescent young women are often coupled with significant difficulties coping in stressful situations. In addition avoidant coping mechanisms have been found to be associated with the development and maintenance of EDs. Given the association between greater levels of SOC and better coping and resiliency SOC is likely to be salient in relation to DEP and ED risk factors (Harrison et al. 2010). Moreover, research indicates that major characteristics of eating disorder symptomatology are socially connected by emphasizing the central role of interpersonal factors in the development and maintenance of EDs. Consistent with this, there is growing evidence showing the existence of interpersonal difficulties among individuals with an EDs (Wilfley et al. 2003). Taken together the consistency with which SOC is related to general mental health in adolescents and it's likely correlates with risk and protective factors for EDs, it is a natural variable to explore both from a prevention and interventional standpoint with regard to DEP.

Therefore, the current study has two main goals:

1. Examine the rate of clinically relevant DEP, among a sample of Israeli adolescent girls age 12–18.
2. To assess the role of SOC in relation to DEP, body dissatisfaction and related factors in this population.

Method

Participants

Two hundred forty-eight Jewish, female, secular adolescent girls participated in the study. All were fluent Hebrew speakers, from ages 12–18. One hundred and six of them were from middle school (age 12–14.5), and 142 were from high school (14.5 and above). The rationale for creating two sub-groups based on age is rooted in the literature that divides adolescents into two major development periods: ages 12–14 and ages 15–18 (Steinberg 2002; Abraham et al. 2009). The study was conducted in public schools with students from urban and rural areas of northern Israel. The data was collected at the end of the academic year during the school

day. Nineteen participants (7.6%) refused to participate in the study.

Procedure

The present study received the approval of the Chief Scientists of the Ministry of Education (equivalent to the Institutional Review Board) as well as the principals of the schools that participated. Students' parents were sent a letter that presented the goal of the study while emphasizing participant anonymity. Parents who did not want their daughter to participate were asked to sign and return the letter to the school. The participants were given a general explanation regarding the study's goal, and told that participation was voluntary and anonymous. The questionnaires were completed during gym classes, during which the girls were separated from the boys.

Measures

Demographics

Participants provided demographic data including age, grade, height and weight. BMI was calculated using height and weight [using $\text{weight (kg)/height}^2 \text{ (m}^2\text{)}$] (Prentice and Jebb 2001).

The Eating Attitude Test (EAT-26)

The Eating Attitude Test (EAT-26)—(Garner and Garfinkel 1979; Garner et al. 1982), is a widely used screening instrument for measuring eating attitudes in large non-clinical populations. The EAT-26 consists of 26 items scored on a three-point Likert scale. The EAT-26 contains a general (sum) score, and three subscales. For the purposes of this study, the total score was used. The EAT-26 has been translated and validated into Hebrew (Ianuca 1990). Cronbach's alpha for the total score has been reported at .70 *n*, in the current sample alpha for the total score = 0.84.

Additionally, scores ≥ 20 indicate elevated body shape and weight concerns and can be used to identify those individuals at high risk for developing an eating disorder. Therefore, the cutoff score for the EAT is used to identify levels of DEP that may be of clinical relevance. In the current study the EAT is used as both a categorical measure of clinically relevant DEP and a continuous measure of overall DEP.

Eating Disorder Inventory (EDI-2)

Eating Disorder Inventory (EDI-2)—(Garner et al. 1983; Garner 1991) contains 91 items, which are rated on a six point scale and are divided into 11 subscales. The EDI-2 has

been found to be a valid and reliable instrument in a wide range of different settings and has been translated into many different languages, including Hebrew (Niv et al. 1998).

In the current study we used two subscales: drive for thinness (DT) ($\alpha = 0.84$) and body dissatisfaction (BD) ($\alpha = 0.88$) as well as the total the total score ($\alpha = 0.89$).

The Body Shape Questionnaire (BSQ)

The Body Shape Questionnaire (BSQ), (Cooper et al. 1987) assesses body shape concerns, self-depreciation due to physical appearance, and the cognitive experience of feeling fat. BSQ contain 34 items on Likert scale between 1 and 6, the score is between 34 and 208. The higher the score the lower the body image. Score above 98 represent lower body image. Cronbach's alpha for the current sample ($\alpha = 0.97$).

Sense of Coherence (SOC)

Sense of Coherence (SOC)—(Antonovsky 1985, 1987) SOC defined as a global orientation that expresses the extent to which one has a pervasive, enduring and dynamic, feeling of confidence, and that (a) the experience of internal and external environments is structured, predictable, and explicable; (b) the resources are available to meet the demands posed by the experience; and (c) these demands present challenges worthy of investment and engagement. SOC includes 29 items on a seven point Likert-type scale where 1 = never and 7 = always. For the purposes of this study the total score was used. Cronbach's alpha for the SOC general score ($\alpha = 0.87$).

Data Analysis

Data were analyzed using SPSS version 24 for Windows. Descriptive and inferential statistical output was generated based on a *p* value of < 0.05 (two-sided). Age groups were classified as younger adolescents ages 12–14.5 and older adolescents ages 14.5–18. Clinical cut-off scores on the EAT were used to identify high risk individuals within each age bracket.

Zero-order correlations were computed for all measures of DEP (as measured by the EAT-26, the BSQ, and EDI-drive for thinness and body dissatisfaction subscales), BMI, SOC.

Further, stepwise linear regression was used to examine whether age and SOC significantly predicted DEP as measured by the EAT-26, the BSQ, and the EDI-drive for thinness and body dissatisfaction subscales. Four individual regression models were run, using each measure of DEP above as an outcome with SOC as a predictor. In addition, BMI was entered as a covariate in the models.

Results

Participant Characteristics

In the present study, 248 adolescent females participated in the study. The mean age for the total sample was 14.8 ± 1.48 . Mean BMI for the total sample was 20.23 ± 2.88 . There were no significant differences in BMI between the younger and older group.

Aim 1

Examine the rate of clinically relevant DEP, among a sample of Israeli adolescent girls ages 12–18.

A clinical cutoff score of 20 or above on the EAT-26 was used to identify girls in the “high risk” category. Those with a score below 20 were categorized as “low risk.” Fifty-six individuals (22.5%) were found to be at high risk of eating disorders ($EAT-26\text{-sum} \geq 20$). There was no significant difference for age ($X^2 = .36, p > .05$), with 20.0% from the younger group (ages 12–14.5) and 24.8% from the older group considered to be at high-risk (ages 14.5 and above),

Aim 2

To examine the role of SOC, in relation to DEP, and to assess whether SOC predicts scores on the EAT-26, BSQ, and EDI subscales.

Table 1 presents the zero-order correlations between the Total EAT-26, BSQ, EDI-DT (drive for thinness), EDI-BD (body dissatisfaction), SOC, and BMI scores. As shown in Table 1, SOC is strongly correlated with all measures of DEP and body dissatisfaction at the (.01 or below level). SOC is not associated with age or BMI.

As shown in Table 2, regression analyses revealed that SOC was a significant predictor of all measures of DEP even when controlling for BMI, indicating that greater SOC is associated with lower levels of DEP even when controlling for one of the most relevant variables associated with EDs.

Discussion

The current study aimed to assess the rates of clinically relevant levels of DEP including body shape concerns among Israeli adolescent girls. Additionally, we sought to clarify role that SOC plays in relation to DEP and related risk factors. Using the clinical cut-off score on the EAT-26, 22.5% of the sample were found to be at high-risk for EDs. According to this criterion, the younger group had lower rates of DEP and lower level of body shape concern than the older group however, this was not statistically significant. Nevertheless, this pattern is in line with previous research among a similar population indicating higher risk among older adolescents. It is also notable, that overall rate of those in the high risk group is higher than previously seen among

Table 1 Zero-order correlations of measures of disordered eating pathology and sense of coherence

Measure	EAT-26	BSQ	EDI-DT	EDI-BD	BMI	SOC
EAT-26	–	.75**	.70**	.59**	.10	–.213**
BSQ		–	.81**	.80**	.34**	–.42**
EDI-DT			–	.70**	.38**	–.26**
EDI-BD				–	.34**	–.38**
BMI					–	–.10
SOC						–

EAT-26 Eating Attitudes Test, *BSQ* Body Shape Questionnaire, *EDI-DT* Eating Disorder Inventory Drive for Thinness Subscale, *EDI-BD* Eating Disorder Inventory Body Dissatisfaction Subscale, *BMI* Body Mass Index, *SOC* sense of coherence

**Significant at the .01 level

Table 2 Regressions using sense of coherence as a predictor with measures of disordered eating pathology as outcomes

	EAT-26			BSQ			ED-Dt			EDI-Bd		
	B	(SE)	p	B	(SE)	p	B	(SE)	p	B	(SE)	p
BMI	.29	(.22)	n.s.	4.48	(.75)	< .001	.77	(.123)	< .001	.71	(.14)	< .001
SOC	–2.74	(.83)	< .01	–20.60	(2.86)	< .001	–1.89	(.46)	< .001	–3.48	(.54)	< .001

BMI Body Mass Index, *SOC* sense of coherence, *EAT* Eating Attitudes Test, *BSQ* Body Shape Questionnaire, *EDI-Dt* eating disorders inventory—drive for thinness, *EDI-Bd* eating disorders inventory—body dissatisfaction

samples from a similar population (19.5% vs. 22.5%) (Latzer and Tzischinsky 2005; Latzer et al. 2007).

In addition, further comparison with previous data suggests that although the differences in clinically significant levels of DEP are similar, overall levels are higher for both age groups. Although the percentage of those at risk does not differ significantly by age in the current sample, it does suggest an upward trend in DEP which may be reflective of a greater overall risk and greater preoccupation and concern with weight and body image in younger and older adolescents. Research findings show that between the ages of 15 and 18 the adolescents girls are within or towards the end of their emotional, cognitive sexual maturation, while during the ages of 12–14 they are in the beginning phase of their of sexual, emotional and cognitive maturation (Lerner et al. 2010).

The increasing overall rates of DEP may be related to a variety of factors over the last decade. For example, technology usage among the general population and especially among adolescents in Israel has increased dramatically which may expose children and adolescents to images such as the thin ideal via social media and other outlasts at ever-younger ages. Numerous studies have demonstrated the link between increased exposure to traditional and social media among adolescents as a risk factor of the development of DEP (Shohat et al. 2010; Latzer et al. 2015; Holland and Tiggemann 2016). Therefore, it is possible that what appears to be a relevant increase in those at risk for full blown EDs may be related to shifting technological norms and usage. This is also especially important given the WHO survey to indicate higher rates of dieting among Israeli adolescent girls in comparison to other countries (Harel et al. 2002).

To the best of our knowledge, previous research has not explored the association between DEP, and SOC. Consistent with our hypothesis, it was found that SOC was associated with all measures of DEP and body dissatisfaction. SOC was not associated with age and BMI. Further higher levels of SOC predicted lower levels of DEP and body dissatisfaction even when controlling for BMI.

These results are consistent with previous research showing a strong association between SOC and other forms of psychiatric illness (Antonovsky 1983; Ebert et al. 2002), such as depression and anxiety (Wainwright et al. 2008; Braun-Lewensohn et al. 2017). This is the first study to demonstrate this relationship with DEP. SOC is of particular relevance to this sample as SOC has consistently been shown to be associated with coping and emotional regulation (Byrne et al. 2007) and adolescence is a critical period for the formation of coping skills and emotional maturity. Adolescence presents as a time of upheaval for many individuals as adolescents attempt to form identities and interpersonal relationships. SOC has been shown to generate greater levels of coping abilities and better self-esteem which likely mitigates

the negative impact of distorted message and social pressures relating to appearance and thinness during this developmental period. This suggests strengthening SOC among adolescents and promoting adaptive coping skills may be a useful addition to the repertoire of eating disorder prevention tools currently used.

Strength and Limitations

The importance contributions of the current study are two-fold: First, the results indicate a clear overall increase in symptoms and behaviors of DEP among adolescents girls in Israel and increased among the younger age group as compare to the previous results within the same age bracket (Latzer and Tzischinsky 2005). Second, the study makes a significant novel contribution to the literature by showing a positive correlation between high SOC and various physical and mental health conditions and specifically DEP in adolescents. This study contributes both to the literature on SOC regarding its far reaching impact on coping and resiliency in adolescents, as well as the literature on DEP and body image with regard to how SOC can be incorporated to understand the interpersonal difficulties often observed in these conditions.

The study also has several limitations, which need to be addressed. The sample represents a relatively homogeneous population from the Northern part of Israel from a mainly middle class background from both urban and rural areas. Thus, it is difficult to generalize to the rest of Israel, whose population is actually quite diverse. In addition, although the measures of DEP used in the study are among the most widely used, the data were collected exclusively through self-report and therefore cannot be used for diagnostic purposes. Furthermore, the current study is a cross-sectional design and therefore causal inferences can't yet be drawn about the influence of the observed variables on the longitudinal development of DEP.

Further research including other clinical symptoms like psychiatric, psychological, and cognitive variables in relation to SOC and DEP would add valuable knowledge to the treatment and prevention of DEP and EDs.

Implications and Conclusion

To the best of our knowledge this is the first study to assess the relationship between SOC, and variables related to DEP and body dissatisfaction. This adds to the literature on SOC and overall mental health in addition to adding to an understanding of possible factors related to DEP. Adolescence is a critical period in terms of the development of healthy coping mechanisms and emotional flexibility which is represented

by SOC. Strengthening SOC among adolescents and promoting resilience may be a useful tool in the prevention of risky behaviors in general and disordered eating in particular. It has been consistently demonstrated that in order to be effective, and without increasing risk further, ED prevention should not focus specifically in eating disorders per se but rather on aspects such as media literacy, body acceptance, resolving interpersonal conflicts and general coping (Stice et al. 2012). Therefore, promoting SOC seems a natural addition to this perspective. Furthermore, because it appears that there has been an increase in overall levels of risk for the development of EDs over the last several years, an emphasis on prevention in earlier adolescence with a focus on coping, self-esteem and problem solving (all aspects of SOC), should be emphasized.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no competing interests.

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