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Universal prevention in eating disorders: A systematic narrative review of recent studies

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ABSTRACT

In the field of eating disorders, much research has been devoted to selective prevention that addresses high-risk groups, while universal prevention has received less attention. This paper systematically reviews recent studies on the universal prevention of ED. The analysis shows that universal prevention may impact on a wide range of eating disorder risk factors such as body dissatisfaction and media internalization. However, no study has investigated later presence or absence of ED. We conclude that additional research is needed to shed more light on the long-term effects and the actual onset of ED. "Booster-sessions" in the years following the intervention might aid in sustaining the gains.

1. Introduction

Eating disorders are severe mental disorders with multiple, overlapping negative effects such as role impairments, high risk for comorbid disorders (Preti et al., 2009), long-term negative effects on quality of life (Herpertz-Dahlmann, Wille, Hölling, Vloet, & Ravens-Sieberer, 2008; Pohjolainen et al., 2016), and psychological distress (e.g., Kärkkäinen, Mustelin, Raevuori, Kaprio, & Keski-Rahkonen, 2018). The prevalence of all eating disorders together with subthreshold eating disorders is estimated to range between 10% and 12% (Hudson, Hiripi, Pope, & Kessler, 2007; Stice, Marti, Shaw, & Jaconis, 2009), and up to 13% when the new DSM-5 criteria are applied (Stice, Marti, & Rohde, 2013). Also, mortality rates, in particular in anorexia nervosa, are elevated compared to other mental disorders (Hoang, Goldacre, & James, 2014; Smink, van Hoeken, & Hoek, 2013). ED also negatively impacts the patients´ families (Coomber & King, 2013; Zabala, Macdonald, & Treasure, 2009), and direct and indirect treatment costs for ED, e.g. for treating physical side-effects, are high (Simon, Schmidt, & Pilling, 2005).

The gravity of the impact on patients' lives, elevated mortality rates, and high treatment costs has resulted in an intensified research interest directed towards the prevention of ED (e.g. Stice & Shaw, 2004; Stice, Shaw, & Marti, 2007). The importance of empirically well-founded prevention programs is emphasized even more when the prognosis of a full-blown eating disorder is taken into consideration. There is evidence for the efficacy of family-based and cognitive-behavioral therapy (CBT) in anorexia (Espie & Eisler, 2015) and bulimia (Waller et al., 2014). Yet, research reveals considerable drop-out rates (Zeeck, Hartmann, Buchholz, & Herzog, 2005), and only about 40% achieve remission even if the interventions with the best base of evidence are applied (e.g. Agras et al., 2014). Another concern is the low rates of individuals with eating disorders seeking treatment. In their systematic review, Hart, Granillo, Jorm, and Paxton (2011) found that less than one fourth of individuals with ED in community samples sought treatment for their disorder. In sum, the current body of empirical results suggests that a person with ED is unlikely to pursue adequate treatment (Hart et al., 2011) and even if she or he does so, there is only a medium chance of remission (Agras et al., 2014). Therefore, prevention is a highly important research topic in ED.

1.1. The prevention spectrum

According to the mental health intervention spectrum presented by the Committee on Prevention in 2009, preventive measures fall under the categories of universal, selective or indicated, a threefold classification initially proposed by Gordon (1983). Universal prevention

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includes a society´s entire population and therefore addresses individuals of all levels of risk. Its primary aim is to keep risk factors in check and to strengthen protective factors. Selective prevention addresses subpopulations that are considered to bear an above-average risk without demanding individual screening of risk levels. Such a screening does take place in indicated prevention, which focuses on high-risk individuals with early subclinical symptoms of a disorder (Committee on Prevention 2009; Gordon, 1983).

This theoretical threefold classification becomes fuzzy when it is applied to real samples of participants (see Levine, 2017). For example, school-based ED prevention programs include very large samples without considering the participants' individual risk statuses. Nevertheless, age may already count as a risk factor, and one could argue that a real universal program would have to address every individual in a population that might be affected by an ED. From this point of view, school-based interventions combine features of both universal and selective prevention.

1.2. Existing meta-analyses and systematic reviews on ED prevention

In their meta-analyses, Stice and Shaw (2004) and Stice et al. (2007) found selective and indicated programs (the authors themselves combine them into the term selected prevention), including participants with measurable signs of pathological eating, to be more effective in reducing risk factors for eating disorders than universal programs. As pointed out by Stice et al. (2007) and Wilksch (2014), high-risk populations have higher baseline scores of ED symptoms so that larger effect sizes for selective and indicated prevention programs are a logical consequence. On a similar note, Nehmy and Wade (2014) differentiate between a "prevention effect" (i.e. prevented increase in risk factors, which is the aim of universal prevention) and a supposedly higher "intervention effect" (i.e. reduction in risk factors or symptoms, aim of selective and universal prevention). Also, a high-risk status might increase willingness to comply with the aims of the program (Stice et al., 2007). To date, many studies have been conducted to evaluate and improve selective and indicated prevention programs, while research on universal programs is scarcer (Nehmy & Wade, 2014; Wilksch, 2014). Consequently, the universal prevention programs studied so far may not yet be optimized and need further refinement. An advantage of universal school-based programs is that children or adolescents might benefit independent of their current risk status, whereas selective and indicated prevention programs reach only those who are defined as definitely at-risk or as high-risk individuals at the time of the preventive measure (Stice & Shaw, 2004). Another advantage of universal programs is their high acceptability and that there is no risk of stigmatization for participants with high risk and first symptoms (who, of course, are also included in universal prevention samples) (Nehmy & Wade, 2014). Since the assumption is plausible that risk factors vary considerably over time within the same person (see McKnight Investigators, 2003, for a longitudinal analysis of ED risk factors), targeted or selective prevention cannot address all individuals belonging to the high-risk group at any given time in their early life.

Stice and Shaw (2004) conducted a meta-analytic review on universal, selective and indicated prevention programs (the authors subsumed selective and indicated programs under the term selected programs) The authors included controlled trials that tested effects on eating pathology and/or ED risk factors versus a control condition. They found 51 studies and compared effect sizes for different outcome variables. Programs that contained interactive elements produced larger effects than those based on psycho-education (Stice et al., 2007). Larger effects were also seen for selective and indicated prevention programs (in contrast to universal ones, see above for this aspect), for multisession (in contrast to single session) programs, for programs conducted only with female participants and with participants older than 15 years (Stice et al., 2007). In an updated meta-analysis published three years later, Stice et al. (2007) confirmed and expanded these results and found that further moderators of effect size were administration by professional interventionists and the inclusion of body acceptance and dissonance-induction content.

Yager, Diedrichs, Ricciardelli, and Halliwell (2013) compiled a systematic review of universal school-based programs for preventing body dissatisfaction, one of the most important risk factors for the later onset of an eating disorder. They found that only half of the 16 programs included in their review were effective in improving body image, and effect sizes were small. Wilksch (2014) published an update on prevention studies conducted since the meta-analysis by Stice et al. (2007). The author cites only 10 studies of universal prevention with publication dates between 2006 and 2013, whereas he defines 27 studies as targeted interventions, including selective and indicated prevention programs, for the same period. Wilksch (2014) concludes that more research in the field of universal prevention is needed.

Two recent meta-analyses have applied a more rigorous methodology in accordance with the PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). Watson et al. (2016) systematically reviewed randomized-controlled trials (RCTs) of universal (13 studies), selective (85 studies) and indicated prevention (8 studies). General effect sizes for the analyzed ED prevention programs ranged from small to moderate. Findings revealed dissonance-based approaches as most effective for selective prevention, whereas CBT was supported for indicated prevention. The picture that emerged from their narrative synthesis of the 13 universal prevention trials showed media literacy programs to be the most promising approach, which is partially supported by recent meta-analytic results compiled by Le, Barendregt, Hay, and Mihalopoulos (2017). Le and colleagues included 112 articles (18 RCTs on universal, 79 RCTs on selective and 4 RCTs on indicated prevention) and detected small to moderate effect sizes concerning their effectiveness in reducing risk factors in ED patients. They confirmed media literacy (universal prevention), dissonance-based (selective prevention) and CBT (indicated prevention) as effective interventions. In the field of universal prevention, it is difficult to thoroughly compare the diverse prevention programs using meta-analyses, due to the small number of reported trials and the large heterogeneity in their curricula, as well as in the applied measures of evaluation (Le et al., 2017; Watson et al., 2016).

1.3. Aim of this literature review

The present paper aims at systematically summarizing existing studies on universal prevention programs in the field of eating disorders. In contrast to Yager et al. (2013), we did not restrict our search to programs on body dissatisfaction prevention but targeted all kinds of universal ED prevention programs. However, unlike the meta-analysis by Stice and Shaw (2004) and Stice et al. (2007), as well as the systematic review by Watson et al. (2016), that examined both selective and universal prevention, we focused solely on universal prevention. With no restrictions on the publication year, universal prevention programs have recently been reviewed by Eisenmann, Fröschl, and Stürzlinger (2017). Their broad aim of reviewing effectiveness and efficacy, along with the identification of sociocultural risk factors for developing ED was however restricted to programs which they considered transferable to Germany, while the focus of our review is not on a specific country. In our systematic narrative review, we focused on studies and prevention programs that included all available participants of a cohort, e.g. entire classes. We also included studies solely consisting of female classes, referring to Levine and Smolak (2008), who indicated the need of universal ED prevention in young females. Moreover, we aimed at reviewing studies that measured either ED risk factors or pathological eating behaviors, with no other restriction concerning the study design. While Watson et al. (2016) and Le et al. (2017) included only randomized trials, we aimed at reviewing all trials on universal prevention that fulfilled our inclusion criteria and that were published

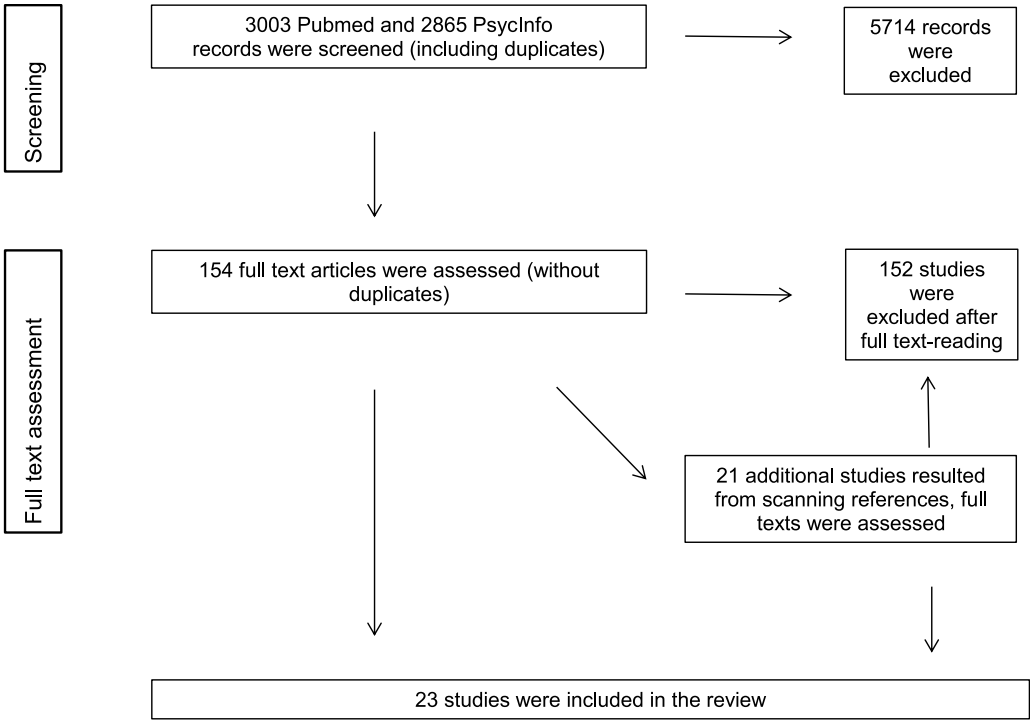

Fig. 1. Flow chart of the literature search.

in the last ten years. We aimed at summarizing all studies published on universal ED prevention programs since the meta-analysis by Stice et al. (2007).

2. Method

2.1. Identification and selection of studies

Regarding eligibility criteria, information sources, search and study selection, this review followed the PRISMA guidelines for conducting and reporting systematic reviews (Ziegler, Antes, & König, 2011).

We conducted a literature search in Pubmed and PsycInfo to find studies on the outcome of universal prevention in eating disorders from the last ten years (April 2006, cut-off for inclusion in Stice et al., 2007, until October 2017). To this end, we used the free text search terms "prevention" OR "preventive" AND "eating disorder" OR "bulimia" OR "anorexia" OR "bulimic" OR "anorectic". Additionally, reference lists of the studies selected for our review and meta-analyses on this topic (Le et al., 2017; Watson et al., 2016) were scanned.

2.2. Our inclusion criteria were

(1) Studies on the outcome of universal prevention of ED and on ED risk factors. As outlined above, we focused on universal programs, not on those addressing only participants at high risk for ED. In practice, universal ED prevention takes place in schools, so that "school-based" might be regarded as a synonym for "universal" in this context. This inclusion criterion implies that we focused on studies without selection criteria based on ED symptoms (indicated programs) or ED risk factors for their participants (selective programs) (e.g., we did not include studies that investigated samples consisting solely of individuals with initial ED symptoms).
(2) Studies that included all available individuals of a cohort (willing to participate), e.g. entire classes, and not only subsamples of a class. This implies that studies were excluded if they recruited their participants online or based on other biased ways (e.g. with flyers distributed on university campuses). Further, we included only studies with $n \geq 50$ (size of at least two classes), to assure a minimum of representativeness of the results reported here.
(3) Studies with an explicit focus on eating disorder or risk factor prevention, including outcome measures such as body dissatisfaction or weight concerns (McKnight Investigators, 2003). Studies that primarily aimed at preventing obesity were excluded, since this is not an eating disorder according to the international classifications of diseases (American Psychological Association, 2013).

2.3. Data collection and synthesis of results

For each study included in this narrative review, the following study characteristics were extracted: First author, year, sample size, PICOS characteristics (participants, intervention, comparisons, outcomes, study design), further specified by mean age of participants, name of the prevention program, quantity of lessons, follow-ups, references of primary outcome measures, main findings and effect sizes. If part of the main findings, moderation and mediation effects were also recorded.

In a second step, theoretical and methodical approaches of the selected studies were reviewed. We conducted a qualitative content analysis (Mayring, 1991). First, we developed assumptions about possible categories of dominant rationales based on existing meta-analyses (inductive approach). Second, we analyzed the selected studies and detected additional categories of dominant rationales (deductive approach). This procedure aimed to categorize the selected programs according to their underlying prevention rationales. Subsequently, two independent raters assigned each selected study to one of the seven identified categories. We discussed any differences in the coding of the two independent raters until we reached agreement. The main findings were reported for each of these study categories. The intention of the present review was a narrative synthesis abstaining from meta-analytic procedures, since the broad inclusion of study designs (no restriction to RCTs), dependent variables and statistical methods (Group differences, regressions, ANOVA, mediation analysis) led to a sample of heterogenous studies not suitable for a meta-analysis.

Table 1
PICOS characteristics (participants, intervention, comparisons, outcomes, study design), findings and limitations of included studies.

First author Year	Participants n (% girls) Age M (SD) classes/ schools country	Intervention control group follow-up	Main outcome measures[1] (selection)	Main findings (Effect Sizes)	Number of sessions educational style facilitator
Dissonnance based interventions					
Berger et al. (2007)	N = 1.006 (all girls) 42 schools Mean age = 11.9 Germany	PriMa Narrative poster sessions in school setting, role plays, phone-hotline Lessons as usual control group 3-month follow-up	Eating behavior (EAT-26D) body self-esteem (FBeK) Figure dissatisfaction (BIS – KEDS)	Effects for body self-esteem (R^2 = 0.19) and eating behavior (R^2 = 0.32) in PriMa girls at risk (Cut-off: EAT-26D ≥ 10) over time, but no effects for figure dissatisfaction. Effects of time over all participants for figure dissatisfaction (R^2 = 0.13) and eating behavior (R^2 = 0.22).	9 lessons Psychoeducation and interactive elements Trained female teachers
Adametz et al. (2017)	N = 100 (all girls) Mean age = 11.91 Germany	PriMa Control group 7–8 year follow-up	Eating attitudes (EAT-26D) Body self-esteem (FBeK)	Effect for body self-esteem (*ES* n.r.) relative to control group over time, but no effect for eating attitudes.	9 lessons Psychoeducation and interactive elements Trained female teachers
Halliwell and Diedrichs (2014)	N = 104 (all girls) Mean age = 12.07, 4 classes/ 1 school United Kingdom	Body Project + psychoeducation + media literacy waitlist control group 5-week follow-up media exposure experiment	Thin-ideal internalization (Thin-Ideal Internalization Scale; Stice & Agras, 1998) Body dissatisfaction (BPS) Dietary restraint (DRES)	Effects for body dissatisfaction (d = 0.29) and thin-ideal internalization (d = 0.35) relative to control group over time. No effect for dietary restraint in either condition. Increased resilience of intervention group to negative media effects at follow-up (η^2 = 0.08).	4 lessons Psychoeducation and interactive elements Researchers or doctoral students
Atkinson and Wade (2015)	N = 347 (all girls) Mean age = 15.70 19 classes/ 4 schools Australia	Body project vs. Mindfulness based intervention Lessons as usual control group 1- and 6-month follow-up	Weight and shape concern (EDE-Q-WSC) Negative affect (PANAS-X) Dietary Restraint (DEBQ-R) Thin-ideal internalization (SATAQ-3) Sociocultural pressure (SATAQ-3 subscale)	No significant differences between the two intervention programs. Effects of mindfulness based intervention for weight and shape concern (d = 0.65), dietary restraint, (d = 0.67), sociocultural pressures (d = 0.47), eating disorder symptoms (d = 0.61), and psychosocial impairment (d = 0.59) relative to control group at 6-months follow-up, but no effects for negative affect and thin-ideal internalization. Effect of dissonance based intervention for sociocultural pressures (d = 0.59) relative to control group at 6-month follow-up.	3 lessons Psychoeducation and interactive elements in all conditions Author vs. trained Psychology students vs. untrained teachers
Ciao et al. (2015)	N = 50 (all girls) Mean age = 13.98 1 school Hawai, US	Peer-led dissonance based intervention Waiting list control group 3-month follow-up	Thin-ideal internalization (SATAQ-3) Body dissatisfaction (BSQ-8) Eating pathology (EAT-26) Dietary Restraint (EAT-26 subscale)	Effects for body dissatisfaction (η^2 = 0.16), eating pathology (η^2 = 0.13), and dietary restraint (η^2 = 0.20) relative to control group over time. Thin-ideal internalization remounted at 3-month follow-up after a previous reduction post-intervention (η^2 = 0.37).	2 lessons Psychoeducation and interactive elements Trained peer-leaders
Becker et al., (2006)	N = 90 (all sorority memebers) Mean age = 18.66 Six campus sororities Texas, US	Peer-led dissonance based intervention vs Peer-led media advocacy No control group 7-week and 8-month follow-up	Dietary Restraint (DRES) Eating Pathology (EDE-Q) Body Dissatisfaction (BSQ-8) Thin-ideal internalization (IBSS-R)	No significant differences between the two intervention groups over time. Stronger effects of cognitive dissonance intervention (d = [0.31; 0.61]) than in media advocacy intervention (d = [0.12; 0.35]) for all outcome measures at 8-month follow-up relative to baseline.	2 lessons each Psychoeducation and interactive elements in both interventions Trained peer-leaders
Becker et al. (2008) (replication of Becker, 2006)	188 (all sorority members) Mean age = 18.64 Texas, US	Peer-led dissonance based intervention vs Peer-led media advocacy 7-week and 8-month follow-up	Dietary Restraint (EDE-Q-R) Body Dissatisfaction (BSQ) Thin-ideal internalization (IBSS-R) Bulimic Pathology (EDE-Q-BN)	No group differences between the two intervention groups over time. Effects of both interventions for all outcome measures (d = [0.30; 1.04]) in high-risk participants (median split: BSQ ≥ 85) at 8-month follow-up relative to baseline.	2 lessons each Psychoeducation and interactive elements in both conditions Trained peer-leaders

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Table 1 (*continued*)

First author Year	Participants n (% girls) Age M (SD) classes/ schools country	Intervention control group follow-up	Main outcome measures[1] (selection)	Main findings (Effect Sizes)	Number of sessions educational style facilitator
Media literacy interventions					
Mora et al., 2015	*N* = 200 (50% girls) Mean age = 13.4 4 schools Spain	Media literacy + Nutrition program vs Theatre program Lessons as usual control group 5- and 13-month follow-up	Eating attitudes (EAT-26, SCOFF) Thin-ideal-internalization (SATAQ-R) Body size dissatisfaction (CDRS) Self-esteem (RSES)	Effects of media literacy and nutrition intervention for self-esteem (d = 0.57) and thin-ideal internalization (d = 0.47) relative to control group over time. Effect of theatre intervention for self-esteem (d = 0.39) relative to control group over time, but no effect for thin-ideal internalization. No effects for eating attitudes, thin-ideal awareness, and body-size dissatisfaction in any group over time.	10 lessons each Psychoeducation and interactive elements in both interventions Authors of the program, trained psychologists, professional actors
Wilksch and Wade (2009)	*N* = 540 (50.6% girls) Mean age = 13.62 (0.37) 24 classes/ 4 schools Australia	Media Smart - media literacy intervention Lessons as usual control group 6-month and 30-month follow-up	Weight and shape concern (EDE-Q -WSC) Dietary Restraint (DEBQ-R) Body dissatisfaction (EDI-BD) Feelings of ineffectiveness (EDI-FOI) Depression (CDI)	Effects for measures of weight and shape concern (d = 0.29), dietary restraint (d = 0.26), body dissatisfaction (d = 0.20), feelings of ineffectiveness (d = 0.23), and depression (d = 0.26) over time relative to controls. Effect for girls` weight and shape concern (d = 0.29) at 30-month follow-up relative to control girls. Effects for boys´ weight and shape concern (d = 0.25), dietary restraint (d = 0.27), and body dissatisfaction (d = 0.21) at 6-month follow-up relative to control boys.	8 lessons Interactive elements First author of the program
Wilksch, 2015	*N* = 51 (52.7% girls) Mean age = 12.43 (0.61) 2 classes/ 1 school Australia	Media Smart Lessons as usual control group 6-month follow-up	Shape and weight concern (EDE-Q-WSC) Body dissatisfaction (EDI-BD) Thin-ideal internalization (SATAQ-3,) Feelings of ineffectiveness (EDI-FOI) Weight-related peer teasing (MFRS)	Effects for feelings of ineffectiveness (d = 0.52) and weight-related peer teasing (d = 0.68) over time relative to control group, but no effects for weight and shape concern and thin-ideal internalization. Effect for girls´ feelings of ineffectiveness (d = 0.49) at post-intervention relative to control-girls, and effects for girls´ weight related peer teasing at post-intervention (d = 0.46) and at 6-month follow-up (d = 0.62) relative to control girls.	8 lessons Interactive elements Trained teachers
Wilksch et al., 2015	*N* = 1316 (63.8% girls) mean age = 13.21 86 classes/ 12 schools Australia	Life Smart HELPP (based on Happy being Me) Media Smart Lessons as usual control group 6- and 12-month follow-up	Eating disorder risk factors (EDE-Q) Body dissatisfaction (EDI-BD) Thin-ideal internalization (SATAQ-3) Weight-related peer-teasing (MRFS)	Effects for weight and shape concern favoring Media Smart girls (d = 0.34) and HELPP girls (d = 0.43) relative to Life Smart girls at 12-month follow-up. Effects for eating concerns and perceived pressure favoring Media Smart girls (d = [0.45; 0.47]) and control girls (d = [0.35; 0.44]) relative to HELPP girls at 6-month follow-up. Effects for thin-ideal internalization favoring Media Smart boys (d = [0.48; 0.68])and HELPP boys (d = [0.47; 0.48]) relative to control boys that sustained at 12-month follow-up.	8 lessons each Interactive elements in all programs Trained postgraduate psychology students
See also Becker et al. (2006, 2008).					
Body image interventions					
Niide et al., (2013)	*N* = 297 (n.r.) 8 schools Hawai, US	Healthy Body Image Curriculum No control group No follow-up	Self-esteem (Piers Harris 2) Body dissatisfaction (FRS) Eating attitudes and behaviors (ChEAT)	Effects for all outcome measures (*ES* n.r.) at post-intervention.	10 lessons Psychoeducation and interactive elements Trained teachers

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Table 1 (*continued*)

First author Year	Participants n (% girls) Age M (SD) classes/ schools country	Intervention control group follow-up	Main outcome measures[1] (selection)	Main findings (Effect Sizes)	Number of sessions educational style facilitator
Wilksch and Wade (2013)	*N* = 115 (45 girls) Mean age = 12.71 5 classes/ 1 school Australia	Life Smart Interactive psychoeducative intervention Lessons as usual control group 5-week follow-up	Weight and shape concern (EDE-Q-WSC) Dietary Restraint (DEBQ-R) Body dissatisfaction (EDI-BD) Thin-ideal internalization (SATAQ-3) Depression (CDI) Weight-related peer teasing (MRFS)	Effect for weight and shape concerns (d = 0.54) at post-intervention relative to control group, with a pronounced effect in girls (d = 0.78), but no effects for dietary restraint, body dissatisfaction and thin-ideal internalization. Effects for girls` body dissatisfaction (d = 0.57) and weight related peer teasing (d = 0.63) at post-intervention relative to control girls.	8 lessons interactive clinical psychologist
McCabe et al. (2006)	*N* = 368 (47% girls) Mean age = 10.14 18 classes/ 4 schools Australia	ACE Kids - intervention focusing on physical activity, self-image and peer-relationship Lessons as usual control group No follow-up	Positive and negative affect (PANAS-C) Body image (4 items: Weight dissatisfaction, muscle dissatisfaction, weight importance, muscle importance)	Effect for boys` negative affect (*ES* n.r.) relative to control boys at post-intervention. Boys report more importance and dissatisfaction on muscles than girls. Girls report a greater importance on weight with increasing grade level and a greater dissatisfaction with their own weight.	8 lessons Psychoeducation and interactive elements teachers
Ross et al. (2013)	*N* = 60 (all girls) Mean age = 11.25 5 classes/ 5 schools Australia	Y´s Girl intervention focused on body image and associated risk factors (6 lessons) Control group No follow-up	Body satisfaction (BESAA, CDRS) Thin-ideal internalization (SATAQ-3) Body comparisons (PACS) Self-esteem (RSES) Dietary restraint (DEBQ-R) Bulimic behavior (EDI-BN) Quality of peer relationships (IPPA subscale) Appearance conversations (ACS)	Effects for body satisfaction body satisfaction (η^2 = 0.17), thin-ideal internalization (η^2 = 0.15), body comparisons (η^2 = 0.15), and self-esteem (η^2 = 0.13) relative to control group at post-intervention. No effects for dietary restraint, bulimic behavior, quality of peer-relationships, and appearance conversations relative to control group over time. Effect for body satisfaction moderated by initial levels of body comparison (R^2 = 0.29), self-esteem (R^2 = 0.20), appearance conversations (R^2 = 29), and dietary restraint (R^2 = 0.21).	6 sessions interactive elements Trained researchers
Bird et al. (2013)	*N* = 88 (47.7% girls) age = 10–11 2 classes/ 2 schools United Kingdom	Happy being me Manualized intervention focused on body image and associated risk factors Lessons as usual control group 3-month follow-up	Body satisfaction (BSVAS, adapted version) Thin-ideal internalization (SATAQ-3) Dietary restraint (TFEQ - DR) Emotional eating (TFEQ - EA)	Effect for girls´ body satisfaction (d = −1.23) and relative to control girls at 3-month follow-up. but no other effects that maintained at follow-up.	3 sessions Interactive elements First author of the program
Psychoeducative interventions					
Pokrajac-Buljan et al. (2006)	139 students (50.36% girls) Mean age = 12.8 2 schools Croatia	Manualized intervention focused on risk factors using interactive cognitive restructuration Control group 6-month follow-up	Eating attitudes (ChEAT) Dieting behavior (ADS) Self-esteem (CSES) Knowledge of the topics	Effects for girls` and boys` eating attitudes, dieting behavior, and knowledge (*ES* n.r.) relative to control group over time, but no effect for self-esteem.	6 lessons Mainly psychoeducation but also interactive elements Psychologists and authors of the program
Gumz et al. (2017)	*N* = 1452 (56% girls) Mean Age = 14.5 Germany	Prevention Program focusing on ED pathology and risk factors Lessons as usual control group 6-months follow-up	Eating pathology (Ch-EDE) Thin-ideal-internalization (SATAQ-G)	No effects for eating pathology. Indirect effect for eating pathology at post-intervention mediated by pressure to suit the thin-ideal (SATAQ-G subscale) at post-intervention (β = 0.028)	3 lessons Psychoeducation and interactive elements
Mindfulness based interventions					
Johnson et al. (2016)	*N* = 308 (47,7% girls) Mean age = 13.63 17 classes/ 7 schools Australia	.be (“Dot be”) mindfullness based intervention targeting depression anxiety and eating disorders Lessons as usual control group 3-month follow-up	Negative Affect (DASS) Weight and shape concerns (EDE-Q-WSC) Wellbeing (WEMBWS)	No effects for of any outcome measure relative to control group at post-intervention or at 3-month follow-up.	9 lessons Interactive elements First author and a mindfulness practitioner

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Table 1 (*continued*)

First author Year	Participants n (% girls) Age M (SD) classes/ schools country	Intervention control group follow-up	Main outcome measures[1] (selection)	Main findings (Effect Sizes)	Number of sessions educational style facilitator
See also Atkinson and Wade (2015).					
Multiple approach interventions					
Berger et al. (2014)	*N* = 533 (52.0% girls) Mean age = 13.1 22 schools Germany	Torera Manualized intervention 2 control groups (untreated, pretreated) No follow-up	Eating behavior (EAT-26D, SCOFF) Body self-esteem (FBeK)	Effects for eating behavior in girls at risk (d = [0.35; 0.66]) Girls and students at risk improved significantly on eating behavior, mediated by body-esteem ($a \times b$ = 0.06)	9 lessons Psychoeducation and interactive elements trained teachers
Sharpe et al. (2013)	*N* = 468 (all girls) mean age = 13.06 16 classes/ 3 schools United Kingdom	Me, You, & Us Manualized body image program Lessons as usual control group 3-months follow-up	Eating pathology (EDDS) Body esteem (BESAA) Thin-ideal internalization (SATAQ-3) Self-esteem (Single-Item Self-Esteem Scale)	Effects for body-esteem (d = 0.12), self-esteem (d = 0.20), and thin-ideal internalization (d = 0.17) relative to control group at 3-month follow-up.	6 lessons Psychoeducation and interactive elements trained teachers
Other interventions					
Breithaupt et al. (2017)	*N* = 83 (all girls) Mean age = 6.34 6 schools Midwest, US	REbeL semi-manualized peer-led intervention based on empowerment and cognitive dissonance No control group No follow-up	Body esteem (BESAA) Empowerment Scale (Rogers, Chamberlin, Ellison, & Crean, 1999) Body surveillance (BCQ) Thin-ideal internalization (IBSS-R) Perceived pressure to be thin (PSPS)	Effects for body surveillance (d = 0.73), thin-ideal internalization (d = 0.41), and empowerment (d = 0.72) relative to control group at post-intervention, but no effects for body esteem and perceived pressure.	6 lessons Psychoeducation and interactive elements Peer-leaders
Scime and Cook-Cottone (2008)	*N* = 130 (all girls) Mean age = n.a. 2 schools New York, US	Girls´Group manualised intervention focusing on risk and protective factors, positive psychology and yoga Control group (not further specified) No follow-up	Drive for Thinness, Bulimia, and body dissatisfaction (EDI-2 subscales) Perceived Stress Scale (PSS) Self-Concept (MSCS)	Effects for drive for thinness (η^2 = 0.115), bulimia (η^2 = 0.039) body dissatisfaction (η^2 0.121) and social self concept (η^2 = 0.030) relative to control group over time, but no effects for perceived stress and self-concept.	10 sessions interactive elements Experts

Note. All reported effects meet a significance level of α = 0.05 or lower. n.r. = not reported. EAT-26D = Eating Attitudes Test German Version, Meermann and Vandereycken (1987). FBeK = Fragebogen zur Beurteilung des eigenen Körpers [Questionnaire for assessing the own body], Strauß and Richter-Appelt (1996). BIS - KEDS = Body Image Silhouettes of the Kids Eating Disorder Survey, Childress, Jarrell, and Brewerton (1993). BPS = Body Parts Scale, Berscheid, Walster, and Bohrnstedt (1973). DRES = Dutch Restrictive Eating Scale, van Strien, Frijters, van Staveren, Defares, and Deurenberg (1986). EDE-Q = Eating Disorder Examination - Questionnaire, subscales: BN = Bulimia, WSC = Wheigt and shape concern, R = Dietary restraint, Fairburn and Beglin (1994). PANAS-X = Positive and Negative Affect Schedule – Expanded Form, Watson and Clark (1999). DEBQ-R = Dutch Eating Behavior Questionnaire - Restrained subscale, van Strien, Frijters, Bergers, & Defares (1986). SATAQ-3 = Sociocultural Attitudes Towards Appearance Questionnaire-3 Thompson, van den Berg, Roehrig, Guarda, and Heinberg (2004). BSQ-8 = Body Shape Questionnaire - 8, Cooper, Taylor, Cooper, and Fairbum (1987); Pook, Tuschen-Caffier, and Brähler (2008). EAT-26 = Eating Disorder Attitudes Test 26, Garner and Garfinkel (1979). IBSS-R = Ideal-Body Stereotype Scale - Revised, Stice, Ziemba, Margolis, and Flick (1996).SCOFF, Abbreviation reflecting the included items, Morgan, Reid, and Lacey (1999). CDRS = Contour Drawing Rating Scale, Thompson and Gray (1995). RSES = Rosenberg Self-Esteem Scale, Rosenberg (1965).EDI-BD = Eating Disorder Inventory, subscales: BD = Body dissatisfaction, BN = Bulimic behavior, FOI = Feelings of ineffectiveness, Garner, Olmstead, and Polivy (1983). CDI = Child Depression Inventory, Kovacs (1992). Piers-Harris 2 = Piers-Harris Children´s Self-Concept Scale-2, Piers and Harris (2002). FRS = Children´s Body Figure Rating Scale, Stunkard, Sorensen, and Schulsinger (1983) ChEAT = Children´s Eating Attitude Test, Maloney, McGuire, and Daniels (1988). MRFS = McKnight Risk factor survey, Shisslak et al. (1999). BESAA = Body-Esteem Scale for Adolescents and Adults, Mendelson, Mendelson, and White (2001). PACS = Physical Appearance Comparison Scale, Thompson, Heinberg, and Tantleff-Dunn (1991). IPPA = Inventory of Parent and Peer Attachment, Armsden and Greenberg (1987). ACS = Appearance Comments Scale, Jones, Vigfusdottir, and Lee (2004). BSVAS = Body Satisfaction Visual Analogue Scale, Durkin, Paxton, and Sorbello (2007). TFEQ = Three Factor Eating Questionnaire, subscales: DR = Dietary restrraint, EA = Emotional eating Stunkard and Messick (1985). ADS = Adolescent Dieting Scale, Patton et al. (1998). CSES = Coopersmith Self-Esteem Scale, Coppersmith (1967). Ch-EDE = Eating Disorder Examination Adapted for Children, Hilbert et al. (2013). SATAQ-G = = Sociocultural Attitudes Towards Appearance Questionnaire – German Version; Knauss, Paxton, and Alsaker (2009). DASS = Depression Anxiety, Stress Scales, Brown, Chorpita, Korotitsch, and Barlow (1997). WEMBWS = Warwick-Edinburgh Mental Well-being Scale, Tennant et al. (2007). EDDS = Eating Disorder Diagnostic Scale, Stice et al. (2000). PSPS = Perceived Pressure Scale, Stice and Agras (1998); Stice et al. (1996). PSS = Perceived Stress Scale, Cohen, Kamarck, and Mermelstein (1983). MSCS = Multidimensional Self-Concept Scale, Bracken (1992). PANAS-C = Positive and Negative Affect S cale for Children, Patton et al. (1998).

3. Results

The search yielded 3003 hits in Pubmed and 2865 in PsycInfo. In the next step, after elimination of duplicate titles from the two sources, all titles and abstracts were screened. 153 studies were deemed eligible for the review, and the full text of these studies was evaluated. One study was excluded because it reported the same data as one of the included studies (Wilksch, & Wade, 2014). Applying our inclusion and exclusion criteria, 23 studies were selected for this review (see flow chart Fig. 1 and Table 1).

3.1. Description of the intervention programs evaluated

The studies that met our inclusion criteria evaluated 21 different interventions. Based on the dominant rationale provided in the article, the researchers assigned each intervention to one of seven categories: (1) cognitive dissonance-based interventions, (2) media literacy interventions, (3) body image interventions, (4) psychoeducational interventions, (5) mindfulness-based interventions, (6) multiple approach interventions, and (7) other interventions.

3.2. Cognitive dissonance-based interventions

Four interventions were identified that aimed to reduce thin-ideal internalization by creating cognitive dissonance (Stice, Telch, & Rizvi, 2000). The interventions were all based on cognitive dissonance theory (Festinger, 1957). The eight-lesson prevention program 'PriMa' (Adametz et al., 2017; Berger, Joseph, Sowa, & Strauss, 2007) is targeted towards reducing risk factors for AN, such as problematic eating behavior and low levels of body self-esteem, taking into account the biopsychosocial model of illness (Engel, 1977) in combination with a psychodynamic perspective on AN (Gerlinghoff, Backmund, & Mai, 1993). The "Body Project", the prototypical dissonance-based intervention developed by Stice and Presnell (2007), was present in a four-lesson adaptation addressing girls aged 12–13 (Halliwell & Diedrichs, 2014) and a three-lesson version (Atkinson & Wade, 2015) addressing female adolescents from age 14 to 18. A two-lesson peer-led intervention including the dissonance-inducing "mirror task" was tested in college sororities ("Sorority Body Image Program"; Becker, Bull, Schaumberg, Cauble, & Franco, 2008, Becker, Smith, & Ciao, 2006) as well as in a female high-school sample (Ciao, Latner, Brown, Ebneter, & Becker, 2015). Its primary focus is on reducing the ED risk factors of dietary restraint, eating pathology, thin-ideal internalization and body dissatisfaction.

3.3. Media literacy interventions

Three prevention programs were found which aimed at improving participants' abilities to mindfully use media and to prevent and reduce internalization of the media-propagated thin-ideal. Typical interventions are collective discussions of the construction and content of media images and messages and of the elaboration of protective cognitions. The duration of these programs ranges from three (Becker et al., 2008, 2006) to ten lessons (Mora et al., 2015; Wilksch, 2015; Wilksch et al., 2015; Wilksch & Wade, 2009). The interventions focus on reducing disturbed eating attitudes and ideal aesthetic internalization (Mora et al., 2015) or reducing shape and weight concern (Wilksch, 2015; Wilksch et al., 2015; Wilksch & Wade, 2009). Target audience are either adolescents aged 12–15 (Mora et al., 2015; Wilksch, 2015; Wilksch et al., 2015; Wilksch & Wade, 2009) or female emerging adults from 18 to 21 years of age (Becker et al., 2008, 2006).

3.4. Body image interventions

A rather heterogeneous group of seven prevention programs was identified that treat the risk factor of negative body image concerns without the use of cognitive dissonance strategies. These interventions seek to either weaken negative body image and/or promote a positive attitude towards one´s physical appearance, thus strengthening participant's self-esteem. The interventions differed substantially. More specifically, differences appear when it comes to the use of physical exercise (e.g. yoga; Scime & Cook-Cottone, 2008), the degree of interactivity (e.g. role plays; Wilksch & Wade, 2013), the concrete approach (e.g. positive psychology; Wilksch & Wade, 2013) and the target population (e.g. mixed-sex preadolescents; McCabe, Ricciardelli, & Salmon, 2006). The total number of lessons ranges from three (Bird, Halliwell, Diedrichs, & Harcourt, 2013) to ten (Niide, Davis, Alice, & Harrigan, 2013; Scime & Cook-Cottone, 2008).

3.5. Psychoeducational interventions

Based on a cognitive-behavioral framework, a prevention program of six lessons focused on psychoeducational units for maintaining factors of ED and interactive elements to immunize against the thin-ideal (Pokrajac-Bulian, Živčić-Bećirević, Calugi, & Dalle Grave, 2006). The program concentrates on reducing dietary restraint and preoccupation with shape and weight in adolescents aged 12–13. A more recent intervention program described in Gumz et al. (2017) uses three lessons to teach participants about EDs, aiming to reduce eating disorder pathology and related risk factors (e.g. anxiety). The prevention program addresses students in grades 8 and 11 in Germany.

3.6. Mindfulness-based interventions

Both, the nine-lesson curriculum ".be" for mixed-sex groups (Johnson, Burke, Brinkman, & Wade, 2016) and the shorter three-lesson program for girls described in Atkinson and Wade (2015) are based on the Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002). One intervention targets the reduction of ED risk factors and at the same time the reduction of risk factors for anxiety and depression (Johnson et al., 2016), while the other program seeks to challenge the thin ideal (Aktinson & Wade, 2015).

3.7. Multiple approach interventions

Two prevention programs employ a curriculum consisting of multiple preventive strategies instead of one major approach. The nine-lesson program "Torera" described in Berger et al. (2014) has the most elaborated theoretical background. The intervention is based on the Health Action Process approach (Schwarzer, 1992) and the Stages of Change Model (Prochaska, DiClemente, & Norcross, 1992). It addresses female as well as male students (M_{age} = 13) in Germany. "Me, You, & Us" (Sharpe, Schober, Treasure, & Schmidt, 2013) focuses equally on media literacy, peer interactions, and self-esteem by dedicating two lessons to each topic. This intervention focuses solely on female adolescents (M_{age} = 13).

3.8. Other interventions

The theatre play intervention "Teen Spirit" addresses beauty stereotypes in adolescent boys and girls (Mora et al., 2015). The semi-manualized "REbeL" program (Breithaupt, Eickman, Byrne, & Fischer, 2017) consists of six modules fostering empowerment. It can be scheduled individually depending on the specific intervention setting (e.g. weekly throughout the whole school year) and addresses only female adolescents.

3.8.1. Study results

As with the theoretical approaches of the interventions, the applied methodology in the studies differed to a large extent. We decided not to conduct a quantitative comparison, since we identified too many threats of validity for a meta-analytic approach. To begin with, the

reliability of instruments used were not reported in most studies. Moreover, we were not able to identify all relevant effect sizes, since many studies did not report them properly (e.g. Pokrajac-Bulian et al., 2006). Additionally, a quantitative comparison would have had a rather small testing power, as categories like "mindfulness-based interventions" only included two studies (for an overview of threats of validity in meta-analyses, see Shadish, Cook, & Campbell, 2002). Most importantly, our primary aim was to provide a comprehensive overview of the field of ED prevention programs. To avoid loss of information, we did not conduct a quantitative comparison. Therefore, this section presents a narrative summary of the reported main findings.

3.9. Cognitive dissonance-based interventions

According to Berger et al. (2007), participants who received the "PriMa" intervention significantly improved in measures of body dissatisfaction (ES: $R^2 = 0.13$) and disordered eating behavior (ES: $R^2 = 0.22$) over 30 months post-intervention relative to the control group. Adametz et al. (2017) found no effects for eating behavior, whereas body self-esteem increased up to 7 –8 years after the intervention (ES: not reported). Thin-ideal internalization was found to be ameliorated in three prevention studies (Becker et al., 2008, 2006; Halliwell & Diedrichs, 2014), whereas two studies found no or even a negative effect for this variable (Atkinson & Wade, 2015; Ciao et al., 2015). All effects described were only computed for female participants.

3.10. Media literacy interventions

Participants in the media literacy program investigated by Mora et al. (2015) significantly improved in media literacy (ES: $d = 0.57$) and thin-ideal internalization (ES: $d = 0.39$), but not in thin-ideal awareness and body dissatisfaction relative to the control group. These effects were reported for a mixed-sex sample, while no gender differences were calculated. Multiple studies on "Media Smart" including a Randomized Controlled Trial revealed significant small to moderate effects (ESs: $ds = 0.20$–0.48) of the intervention for diverse risk factors in girls as well as boys that were assessed up to 30 months post-intervention (Wilksch et al., 2015; Wilksch & Wade, 2009). The female media advocacy group of the "Sorority Body Image Program" showed mixed results with small effects (ESs: $ds = 0.12$–0.35) at three-month follow-up compared to baseline in the original trial, but not in the replication trial (Becker et al., 2008, 2006).

3.11. Body image interventions

Among the interventions that primarily aimed at an improved body image, Bird et al. (2013) found the largest effect of the program "Happy-being me" for body dissatisfaction (ES: $d = 1.23$). This was not the case in the extended eight-lesson version (Wilksch et al., 2015). The pilot study of "Life Smart" only had an impact on shape and weight concern (ES: $d = 0.54$) relative to the control group (Wilksch & Wade, 2013). Both versions only found significant effects for female participants. However, significant effects could not be confirmed in a larger sample (Wilksch et al., 2015). Scime and Cook-Cottone (2008) examined the effectiveness of the "Girls´ Group" curriculum, which yielded improvements of body dissatisfaction (ES: $\eta^2 = 0.12$), drive for thinness (ES: $\eta^2 = 0.12$), bulimic behavior (ES: $\eta^2 = 0.03$), and social self-concept (ES: $\eta^2 = 0.04$). The absence of follow-ups limits the informative value of the positive results reported in three studies (Niide et al., 2013; Ross, Paxton, & Rodgers, 2013; Scime & Cook-Cottone, 2008), which partly discovered significant effects for boys as well as girls (Niide et al., 2013).

3.12. Psychoeducational interventions

In the prevention study conducted by Pokrajac-Bulian et al. (2006), risk factors for unhealthy eating attitudes and dieting behavior were found to be reduced at six-months follow-up in the female experimental group (ES: not reported). In the male experimental group, a significant effect on eating disorder attitudes, but not on dietary habits, was noticed. A three-lesson intervention revealed no direct effects for eating pathology (Gumz et al., 2017).

3.13. Mindfulness-based interventions

Girls who participated in the mindfulness-based intervention examined by Atkinson and Wade (2015) significantly improved on various risk factors (ESs: $ds = 0.47$–0.67) relative to controls up to six months after participating. However, there were no significant differences between the mindfulness-based intervention and a cognitive dissonance intervention. In contrast, a study on the longer nine-lesson intervention ".be" (Johnson et al., 2016) revealed no improvement over time relative to the control group.

3.14. Multiple approach interventions

The three-lesson intervention "Torera" yielded moderate effects (ESs: $ds = 0.35$–0.66) at post-intervention for unhealthy eating behaviors in girls at risk (Berger et al., 2014). For boys, small but significant effects were only found for eating attitudes (ESs: $ds = 0.35$). "'Me, You & Us' had the desired post-intervention effect on body esteem (ES: $d = 0.12$), thin idealization (ES: $d = 0.17$), and self-esteem (ES: $d = 0.20$) relative to a lessons-as-usual control group, and these effects remained stable three months later for the female sample (Sharpe et al., 2013).

3.15. Other interventions

Girls participating in the "REbeL" program benefited on measures of body surveillance (ES: $d = 0.73$), thin-ideal internalization (ES: $d = 0.41$), and empowerment ($d = 0.72$), though no follow-up assessments were conducted to reveal the stability of these effects (Breithaupt et al., 2017). The theatre intervention described by Mora et al. (2015) yielded significantly higher self-esteem scores compared to the control group up to 13 months post-intervention, whereas thin-ideal internalization and eating attitudes did not improve significantly in the intervention condition for a mixed-sex sample.

4. Discussion

This narrative systematic review aimed at reviewing recent studies published since the meta-analysis by Stice et al. (2007) on universal prevention of eating disorders and thus to find out whether a lack of universal prevention studies still existed. Also, it might help in answering the question whether the current empiric results on universal school-based prevention are promising enough to invest more money and manpower in that kind of programs. In contrast to previous publications, we did not restrict our review to randomized trials (Le et al., 2017; Watson et al., 2016) nor solely included programs focusing on a specific country (Eisenmann et al., 2017) nor limited our review to studies focusing only on body dissatisfaction reduction (Yager et al., 2013).

We clustered the included studies into categories based on common theoretical rationales that were assumed and specified in the publications of these studies. Some prevention program types, such as cognitive dissonance-based interventions, media literacy, and body interventions, target reducing specific risk factors, whereas other approaches, such as mindfulness-based and empowerment-based interventions, appear to be rather unspecific concerning assumptions

about the development of EDS. Multiple approach interventions included a highly elaborated intervention program combining several theoretical assumptions about the development and prevention of EDs (Berger et al., 2014). Moreover, some studies did not explicitly differentiate between how and which topics were discussed. In our view, it would be desirable that future prevention studies explicitly described the theoretical assumptions of their interventions.

Meta-analyses have provided evidence for the superiority of intervention programs that consist of more than one session, that are interactive instead of using psycho-educational methods, and that are delivered by professional facilitators rather than e.g. teachers (see also Stice & Shaw, 2004; Stice et al., 2007). As reported in this review, the study conducted by Atkinson and Wade (2015) also provides evidence for the importance of expert facilitation. The authors found significant effects on the main outcome variables of a "mindfulness-based intervention" only if an expert guided the classes. Importantly, studies included in this review that used teachers as facilitators also yielded positive outcomes (Sharpe et al., 2013 Berger et al., 2014). Thus, even though statistical meta-analysis of the results was not provided by our review, our findings do not lead to the conclusion that an expert facilitation is indispensable. Ciao et al. (2015) showed in a pilot study that even peer-led classes might be an effective alternative to expert-guided interventions. So far, larger controlled studies investigating the effects of peer-led universal prevention (vs. expert-led) are not available so that it is too early to draw definitive conclusions.

Regarding the follow-ups, the studies in this review mostly investigated three- or six-month periods. Two studies included a 12-month (Wilksch et al., 2015) or 13-month follow-up (Mora et al., 2015), and Wilksch and Wade (2009) a follow-up after 2.5-years. The results of these follow-up measurements give cause for optimism as findings revealed stable effects concerning the reduction of ED risk factors at least for one important risk factor. At this point, we can state that there is evidence for the efficacy of universal prevention programs in reducing risk factors, particularly for programs with a risk factor-specific rationale (e.g. "Happy-being me"; Bird et al., 2013; "Media Smart", Wilksch et al., 2015; Wilksch & Wade, 2009) or an elaborated multiple approach (e.g. "Torera", Berger et al., 2014; "Me, You & Us", Sharpe et al., 2013). So far there is no evidence on whether universal preventive interventions can reliably reduce the later prevalence of ED, which would represent a significant protective effect for affected individuals, their families and the public. Thus, longer observation periods in very large samples are warranted in future studies because onset of ED and/or aggravation of risk factors might occur years after the implementation of a universal ED prevention program. Therefore, an important task for the future will be to maintain positive effects over a long period of time. Booster sessions following the years after the intervention might possibly prove useful in this context.

No study in this review assessed the onset of ED in the months and years following the program. As a consequence, the effect of these interventions on later psychopathological eating problems remains uncertain. Of course, this limitation is due to practical reasons. Most of the studies in our report investigated large samples, and it would have been impossible to conduct long-term follow-ups of all participants including diagnostic interviews in the years following the interventions. Also, since EDs are not a very common disorder and universal samples mainly consist of healthy subjects without particular risks, it would be statistically difficult to detect a reduction in the onset rate of ED. Nonetheless, future studies could carry out such follow-ups on representative subsamples. At this point, it is not possible to conclude whether universal ED prevention programs are actually effective in preventing ED. So far, there is only evidence on the more or less short-term reduction of some ED risk factors.

A common problem of universal prevention programs is that the effects they yield can never be very large for methodological reasons. As mentioned above, the target groups of these programs mainly consist of healthy participants irrespective of risk level for ED. As a natural consequence, the amount of ED risk reduction cannot be as pronounced as in targeted prevention studies. Bearing this in mind, the results of the studies reported in this review nonetheless look very promising.

To our knowledge, only little research on the cost-effectiveness of universal eating disorder prevention has been conducted yet. Wright, Austin, LeAnn Noh, Jiang, and Sonneville (2014) found a school-based ED screening to be cost-effective, but ED prevention programs probably create higher costs than a screening. In contrast, Kass et al. (2017) indicated that stepped care models in the United States, including digital interventions for ED, achieve cost savings in comparison to standard care. Nevertheless, the authors state that there is a need for further studies to systematically analyze the costs of such models.

5. Conclusions

In summary, universal prevention can be an important aspect in the prevention of eating disorders, but results are not strong enough to draw clear conclusions on how it should be implemented on a larger scale. We detected an increasing interest in reducing risk factors in the field of universal prevention (e.g. Johnson et al., 2016) and identified emerging unspecific approaches (e.g. empowerment, Breithaupt et al., 2017). As it has been the case in most interventions reported here, universal prevention programs should focus on body dissatisfaction, thin-ideal and media-internalization, and similar ED risk factors in an interactive manner, with program elements that are derived from applicable psychological theories. Also, mindfulness-based interventions could be helpful (Atkinson & Wade, 2015), but not if they focus on mindful eating (Wilksch et al., 2015). It is important to mention that only two studies included in this review evaluated universal prevention for young emerging adults (Becker et al., 2006, 2008) with rather small effect sizes. In contrast, all the programs included were only evaluated for adolescents, which shows a need for evaluation of universal prevention in young emerging adults. Moreover, there is a lack of knowledge concerning the number of individuals from a prevention cohort that will develop an ED later on. Future studies should also consider the application of expert ratings as well as diagnostic scales or interviews and should include longer periods of follow-up measurements.

Declarations of interests

None

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.mph.2019.200162.

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