

Coping in Children and Adolescents with Obesity: The Costs and Benefits of Realistic versus Unrealistic Weight Evaluations

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The study analysed differences in coping strategies between obese and non-obese children and adolescents (age: 8–14 years) in response to a social stressor. Physicians' diagnoses of obesity and self-reports on height and weight as well as gender and age were considered. A sample of 757 participants responded to an established German coping questionnaire. In addition to general coping strategies, two more potentially weight-related coping strategies were assessed. Adolescent obese girls who reported height and weight realistically showed particularly little social support-seeking behavior. Media use in general increased with age, but was especially high for adolescent obese boys who evaluated themselves as obese. Finally, girls in general and obese children and adolescents who evaluated themselves as overweight or obese showed higher stress-related eating. With regard to coping it seems to be a disadvantage for obese children and adolescents to see themselves as obese. In contrast, obese children and adolescents who have unrealistically positive self-evaluations of their weight report coping strategies similar to those reported by normal weight children and adolescents. It is assumed that positive self-evaluations of body weight prevent especially obese adolescents from inactivity and social isolation. Findings are relevant for the design of interventions to treat obesity.

Keywords: adolescents, children, coping, media use, physician-diagnosed obesity, self-evaluation of obesity, stress-related eating

INTRODUCTION

The German Health Interview and Examination Survey for Children and Adolescents (Kurth & Schaffrath Rosario, 2007) shows that overweight and obesity are an increasing health problem for children and adolescents in Germany. Actual numbers of the prevalence of obese children and adoles-

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cents living in Germany have doubled compared to numbers from 1985 to 1998 (Kromeyer-Hauschild et al., 2001). Overweight and obesity are associated with high blood pressure, adverse lipoprotein profiles, diabetes mellitus, atherosclerotic cerebrovascular disease, coronary heart disease, colorectal cancer and death from all causes, as well as lower educational attainment and poverty (Dietz, 1998). Still, many unanswered questions remain regarding the effectiveness of treatment for obesity in children and adolescents at different levels of obesity, different ages and so forth (Oude Luttikhuis et al., 2009). However, the authors conclude that a combination of three treatment modules appeared to be effective: dietary, physical activity and behaviorally orientated treatment. Amongst others, the latter included stress management, self-regulation skills, self-instructions, self-evaluation and finding social support. According to Mann-Luoma, Goldapp, Khaschei, Lamersm, and Milinski (2002), children and adolescents with obesity never have just a single problem with either nutrition, physical activity, or stress regulation. In their working model of obesity, the authors support the assumption of interacting relationships between all three components. On the one hand, unhealthy nutrition makes individuals more vulnerable for stress; on the other hand, stress can lead to unhealthy nutrition. If people have insufficient exercise, stress reduction is difficult. However, stress can tire a person and therefore inhibit activity. Again, lack of activity does not burn up enough calories and bad nutrition does not provide sufficient nutrients for leisure time and sports.

In this study, we focus on obesity and coping with stress. Several studies have investigated coping with obesity or with the stigma of obesity (for an overview see Puhl & Brownell, 2003). For example, Myers and Rosen (1999) asked 394 obese adults how they were stigmatised and how they cope with such situations. Eleven categories of stigmatising situations and 21 coping categories were teased out. Coping strategies included ignoring the situation, making no response; avoiding, leaving the situation; crying, isolating myself; negative self-talk; eating; social support from other fat/not-fat people; diet; physical violence; responding negatively, returning insults. However, being stigmatised is only one of many stressors. Therefore, the present study aimed to answer the question of whether physician-diagnosed obese children and adolescents differ from healthy controls in coping with daily stressors. Whether or not children and adolescents are diagnosed with obesity, they have to cope with problems that cause stress every day. How much they are burdened with daily life's hassles (including being stigmatised because of obesity) depends on their handling of problems (Lazarus & Folkman, 1984). Stauber, Petermann, Korb, Bauer, and Hampel (2004) and Hölling, Schlack, Dippelhofer, and Kurth (2008) call for special promotion of coping strategies for obese children and adolescents.

Stauber et al. (2004) investigated everyday coping styles in 53 obese children aged 11 to 13 years and in healthy controls, matched by age and gender.

Participants completed the German Coping Questionnaire for Children and Adolescents (Hampel, Petermann, & Dickow, 2001). Five “stress-decreasing” (e.g. seeking social support, distraction, situation control) and four “stress-increasing” (e.g. passive avoidance, aggression, resignation) subscales in response to a social and an academic stressor were assessed with the questionnaire. Differences in coping strategies between obese children and healthy controls were not found. However, within the group of obese children, applying the Dutch Eating Behavior Questionnaire by Franzen and Florin (1997), the authors identified high vs. low emotional eaters and high vs. low external eaters. High emotional eaters as compared to low emotional eaters as well as high external as compared to low external eaters reported higher levels of several “stress-increasing” coping strategies (i.e. high emotional eaters in response to both stressors: higher passive avoidance and resignation; high external eaters in response to the social stressor: higher aggression and resignation).

Hölling et al. (2008) found obese children and adolescents to be especially burdened as compared to children with chronic diseases (i.e. bronchial asthma). In contrast, Warschburger (2005) holds that obese children and adolescents are not automatically more burdened. Constructs like quality of life and well-being have appeared to depend on the self-evaluation of obese children and adolescents. Self-evaluations are operationalised for example by different kinds of categorisations of weight (e.g. “I consider myself as overweight, underweight, or just about right”, Chang & Christakis, 2001; “Do you think you are far too thin, a bit too thin, just the right weight, a bit too fat, far too fat?”, Kurth & Ellert, 2008; perception of weight: “about right, too heavy, too light, not sure”, Viner et al., 2006) or by self-reports on height and weight (e.g. Ezzati, Martin, Skjold, Hoorn, & Murray, 2006). Children and adolescents who evaluate their weight as “just right” report a higher quality of life than normal weight children and adolescents who see themselves as “far too fat” (Kurth & Ellert, 2008). Knowing that the self-evaluation of obesity influences mood and psychological health, we included self-reports of height and weight to see whether their self-reports make a difference for coping strategies within obese children and adolescents.

Few studies have taken into account daily life’s coping in a large sample of obese children and adolescents or included self-reports on height and weight. Compared to the effects of obesity, the effects of gender and grade level on coping strategies are better documented (e.g. Eschenbeck, Kohlmann, & Lohaus, 2007; Vierhaus, Lohaus, & Ball, 2007). Therefore, this study investigates coping styles in obese children and adolescents vs. healthy controls, considering self-reports of height and weight and well-studied variables (i.e. gender and grade level). The following broader coping strategies were assessed: seeking social support, problem solving, avoidant coping, palliative emotion regulation, and anger-related emotion regulation. In addition, we

included two more obesity-specific coping strategies, i.e. stress-related eating and media use (Gross, Meier, Layh, Eschenbeck, & Kohlmann, 2009). Based on the literature mentioned above (Eschenbeck et al., 2007; Mann-Luoma et al., 2002), we expected higher amounts of stress-related eating and media use in obese as compared to non-obese children and adolescents. With regard to self-evaluations of weight in the obese participants, we expected higher avoidant coping (as a general strategy that may express self-enhancement and denial of adverse circumstances, Schwerdtfeger & Kohlmann, 2004) in those participants who evaluated themselves as not obese (and therefore unrealistically positive) compared to those obese participants who evaluated themselves realistically as obese. In addition, we expected the replication of well-documented gender effects with higher reports of seeking social support and problem solving in girls as compared to boys and higher avoidant coping in boys as compared to girls. Obese children and adolescents with realistic self-evaluation of their obesity status are assumed to rely on unfavorable coping strategies (e.g. media use and stress-related eating) to a greater degree than children and adolescents with normal weight or obese children and adolescents with favorable self-evaluations of their obesity status (i.e. under-reporting relative weight).

METHOD

Procedure

A sample of 2,374 young people (children and adolescents aged between 8 and 14 years, 50% boys, 50% with physician-diagnosed obesity¹) were randomly selected from the insureds of a German health insurance company in spring 2007. All of the chosen households received a questionnaire as well as a letter for parents and for the chosen child. In the letters, the aim of the study was explained, parents were asked for consent and requested to support the participation of their child. Children were invited to fill out the questionnaire. A total of 1,046 children (response rate: 44%) responded to the questionnaire. The questionnaire contained questions concerning children's and adolescents' coping styles, health behaviors, leisure and school activities as well as self-reports of age, height, and weight. With self-reported data on height and

¹ In detail, we contacted about 400 children and adolescents of each year of birth between 1993 and 1998 (with physician-diagnosed obesity: 100 girls and 100 boys; without diagnosed obesity: 100 girls and 100 boys). Obesity diagnoses during the year 2004 were based on the ICD-10 international classification of diseases: E65, E66.0, E66.2, E66.8, E66.9 (World Health Organization, 2005). For a total of $N = 92,622$ children and adolescents (48.7% female) aged between 6 and 12 years in 2004 ($M = 9.10$, $SD = 2.00$) independent of age, the stability of physician diagnosed obesity between the years 2004 and 2007 was $r = .63$ (range of r s: .61 to .68).

weight, self-report based body mass index (BMI) was calculated (weight in kilograms divided by the square of height in meters). Taking into account gender and age, self-report based BMI was used to categorise the sample into four weight groups: underweight, normal weight, overweight and obese (Cole, Bellizzi, Flegal, & Dietz, 2000; Kromeyer-Hauschild et al., 2001). Kromeyer-Hauschild et al. (2001) compiled a reference data set with measurements of height and weight from 17,147 boys and girls aged 0 to 18 years. Age and gender-specific percentiles were recommended to assess underweight (under the 10th percentile), normal weight (between the 10th and 90th percentiles), overweight (between the 90th and 97th percentiles) and obesity (above the 97th percentile). For the study, we used data from participants who reported coping styles and their height and weight ($N = 757$, 72% of the respondents, 382 without physician-diagnosed obesity and 375 with physician-diagnosed obesity, 343 boys and 414 girls, mean age $M = 10.85$, $SD = 1.69$).² See Figure 1 for an overview of the sampling procedure.

Participants who did not report on height and weight were excluded. Furthermore, from the group without physician-diagnosed obesity, the relatively small subgroups of participants with self-report based underweight ($n = 37$), self-report based overweight ($n = 33$) and self-report based obesity ($n = 7$) were excluded to allow for simultaneous analyses of gender, grade level, and obesity group. From the group with physician-diagnosed obesity, participants with self-report based underweight ($n = 3$) were excluded.

Physician-diagnosed obesity (ICD-10) as well as participants' self-report based BMI were used to categorise the sample into one normal weight group and three obesity groups (see Table 1): normal weight group (i.e. no diagnosis of obesity and self-report based normal weight, self-report based BMI between the 10th and 90th percentiles, $n = 382$); obesity group I (i.e. physician-diagnosed obesity but self-report based normal weight, self-report based BMI between the 10th and 90th percentiles, $n = 132$); obesity group II (i.e. physician-diagnosed obesity but self-report based overweight, self-report based BMI between the 90th and 97th percentiles, $n = 137$); obesity group III (i.e. physician-diagnosed obesity and self-report based obesity, self-report based BMI above the 97th percentile, $n = 106$).

² There was no systematic drop out with regard to the recruitment process. First, with regard to the 1,046 children who responded to the questionnaire, χ^2 test statistics revealed no association between gender and physician-diagnosed obesity, gender, and year of birth, or year of birth and physician-diagnosed obesity ($ps > .65$). Second, comparing the analysed sample of 757 with complete data and the sample of 253 with incomplete data, there were no differences regarding gender ($p = .36$) and year of birth ($p = .07$, all corrected residuals < 1.96). Due to the study design, there were marginally fewer participants with diagnosed obesity in the sample with incomplete data ($p = .03$).

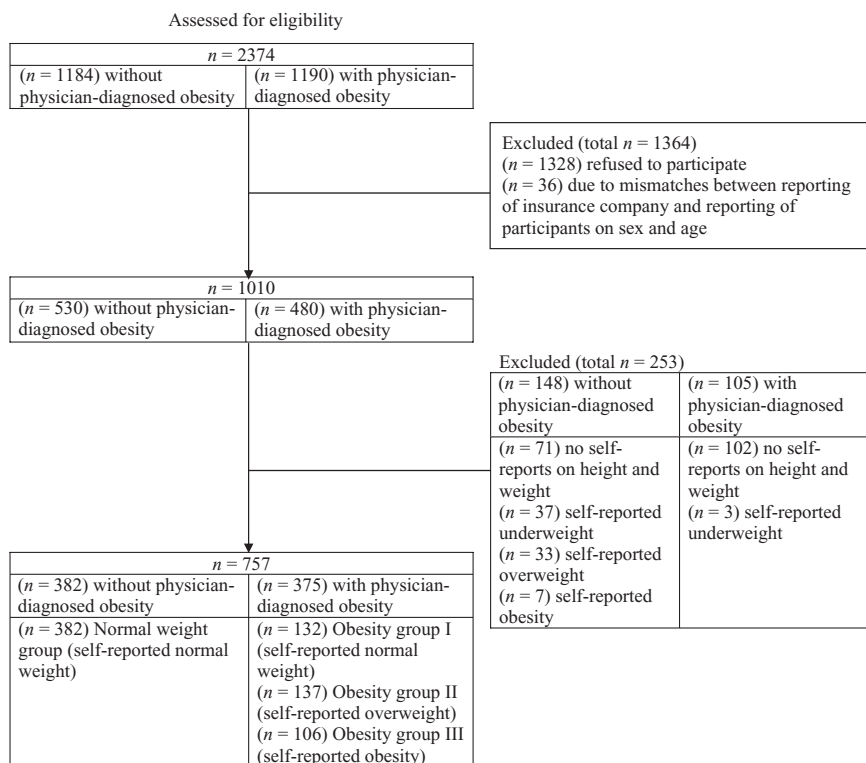


FIGURE 1. Sampling procedure.

Measures

Coping strategies were assessed by a stimulus–response inventory, the revised German Stress and Coping Questionnaire for Children and Adolescents (SSKJ 3-8; Eschenbeck et al., 2007; Lohaus, Eschenbeck, Kohlmann, & Klein-Heßling, 2006). Participants indicated on a 5-point scale ranging from *never* (1) to *most* (5) how often they used a variety of coping strategies in response to a social stressor (i.e. having an argument with a friend).³ A total of 25 coping items were provided representing five dimensions of coping (i.e. five items per dimension): seeking social support (e.g. “I ask someone for

³ The German Stress and Coping Questionnaire for Children and Adolescents (SSKJ 3-8; Eschenbeck et al., 2007; Lohaus et al., 2006) comprises two common stressful situations (social stressor: having an argument with a friend; academic stressor: having problems with doing homework). In this study participants responded only to the “argument with a friend” stressor as it seems more relevant to aspects of coping with obesity in a social setting.

TABLE 1
Sample

<i>Group</i>	<i>Normal weight</i>	<i>Obesity I</i>	<i>Obesity II</i>	<i>Obesity III</i>
<i>Diagnosis of obesity</i>	<i>No</i>	<i>Yes</i>		
<i>Self-report</i>	<i>Normal weight</i>	<i>Normal weight</i>	<i>Overweight</i>	<i>Obesity</i>
Total sample (<i>N</i> = 757)	<i>n</i> = 382	<i>n</i> = 132	<i>n</i> = 137	<i>n</i> = 106
Gender				
Boys (<i>n</i> = 343)	<i>n</i> = 171	<i>n</i> = 49	<i>n</i> = 69	<i>n</i> = 54
Girls (<i>n</i> = 414)	<i>n</i> = 211	<i>n</i> = 83	<i>n</i> = 68	<i>n</i> = 52
Age 8–14 <i>M</i> = 10.9	<i>M</i> = 10.8	<i>M</i> = 11.0	<i>M</i> = 11.0	<i>M</i> = 10.6
Grade levels				
2, 3 and 4 (<i>n</i> = 307)	<i>n</i> = 158	<i>n</i> = 50	<i>n</i> = 44	<i>n</i> = 55
5 and 6 (<i>n</i> = 291)	<i>n</i> = 143	<i>n</i> = 51	<i>n</i> = 65	<i>n</i> = 32
7 and 8 (<i>n</i> = 159)	<i>n</i> = 81	<i>n</i> = 31	<i>n</i> = 28	<i>n</i> = 19

Note: Physician-diagnosed obesity (ICD-10) as well as participants' self-reports of weight and height were used to categorise the sample into one normal weight group and three obesity groups.

help", $\alpha = .78$, $n = 746$), problem solving (e.g. "I try to think of different ways to solve it", $\alpha = .85$, $n = 746$), avoidant coping (e.g. "I tell myself it doesn't matter", $\alpha = .64$, $n = 750$), palliative emotion regulation (e.g. "I try to relax", $\alpha = .77$, $n = 749$), and anger-related emotion regulation (e.g. "I get mad and break something", $\alpha = .76$, $n = 746$). In addition, two more obesity-specific coping strategies (five items per dimension) were assessed: stress-related eating (e.g. "I drink a coke", "I eat sweets", $\alpha = .64$, $n = 748$) and media use (e.g. "I watch TV", "I surf on the internet", $\alpha = .60$, $n = 749$; see also Eschenbeck, Kohlmann, & Meier, in press).⁴

⁴ With regard to the two more obesity-specific coping strategies stress-related eating and media use, there was a positive association between them ($r = .44$, $p < .001$). Also, avoidant coping, palliative emotion regulation, and anger-related emotion regulation correlated positively with these two subscales (r s: .18 to .44, p s < .001). The subscales seeking social support and problem solving were positively related to stress-related eating (r s: .11 to .15, p s < .01) and negatively to media use (r s: $-.10$ to $-.11$, p s < .01; see also Eschenbeck et al., in press).

Statistical Analyses

Seven $4 \times 2 \times 3$ ANCOVAs with group (normal weight group and obesity groups I to III), gender, and grade level (grades 2 to 4; grades 5 and 6; grades 7 and 8) as between-subjects factors and school type (0 = primary school, 1 = secondary school) as covariate were conducted separately for coping styles as dependent variable. In order to control possible influences of gender, grade level, or school type on the configuration of the four groups, we determined χ^2 test statistics. Only school type appeared to be associated with the configuration of groups, χ^2 (3, $N = 757$) = 22.70, $p < .001$. Participants from secondary school as compared to primary school were underrepresented in obesity group II (i.e. physician-diagnosed obesity but self-report based overweight). Therefore, school type was included in the design as a covariate.⁵

RESULTS

Main Effects of Group, Gender, and Grade Level

Univariate ANCOVAs revealed significant main effects for the factor *group* in three out of seven coping strategies: seeking social support: $F(3, 745) = 3.25$, $p < .05$, $\eta^2 = .013$; stress-related eating: $F(3, 747) = 3.40$, $p < .05$, $\eta^2 = .014$; media use: $F(3, 748) = 4.34$, $p < .01$, $\eta^2 = .018$. The normal weight group (no diagnosis of obesity and self-report based normal weight) reported the highest amount of social support. However, post-hoc tests failed significance.

Obesity group III (physician-diagnosed obesity and self-report based obesity) and especially obesity group II (diagnosis of obesity but self-report based overweight, $ps < .03$ Bonferroni adjusted) scored higher in stress-related eating as compared to the normal weight group (no diagnosis of obesity and self-report based normal weight) and obesity group I (diagnosis of obesity but self-report based normal weight).

Media use within obesity group III (physician-diagnosed obesity and self-report based obesity) was especially high as compared to the normal weight group (no diagnosis of obesity and self-report based normal weight) and obesity group I (diagnosis of obesity but self-report based normal weight, $ps \leq .05$ Bonferroni adjusted; for all main effects, see Table 2).

⁵ A test for homogeneity of regression with regard to the ANCOVAs (Tabachnick & Fidell, 2007) showed no violation of homogeneity of regression for the coping strategies (range of ps between .14 and .98) except for seeking social support ($p < .01$). For seeking social support, we repeated the ANOVA without school type as covariate. This procedure replicated the results: group, $F(3, 745) = 3.28$, $p < .05$, $\eta^2 = .013$, gender, $F(1, 745) = 29.29$, $p < .001$, $\eta^2 = .039$, group \times gender, $F(3, 745) = 3.15$, $p < .05$, $\eta^2 = .013$, group \times gender \times grade level, $F(6, 745) = 2.25$, $p < .05$, $\eta^2 = .018$.

TABLE 2
Means (M) and Standard Deviations (SD) for Coping Strategies by Gender, Grade Level, and Group

Coping strategies	Seeking social support	Problem solving	Avoidant coping	Palliative emotion regulation	Anger-related emotion regulation	Stress-related eating	Media Use
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Total sample (N = 757)	14.31 (5.73)	17.73 (5.51)	11.40 (4.49)	13.55 (5.61)	11.41 (5.10)	10.18 (4.24)	10.17 (4.02)
Gender							
Boys (n = 343)	13.18 (5.93)	17.07 (5.65)	12.15 (4.58)	14.20 (5.74)	11.21 (5.23)	9.73 (4.06)	10.35 (4.12)
Girls (n = 414)	15.44 (5.42)	18.40 (5.30)	10.64 (4.30)	12.90 (5.38)	11.62 (4.90)	10.62 (4.35)	10.00 (3.84)
Grade levels							
2, 3, and 4 (n = 306)	14.95 (6.23)	17.36 (6.11)	11.59 (4.92)	14.16 (6.17)	11.11 (5.62)	10.01 (4.66)	8.80 (4.43)
5 and 6 (n = 291)	14.43 (5.39)	17.75 (5.28)	11.52 (4.30)	13.38 (5.36)	11.20 (4.88)	10.03 (4.05)	10.12 (3.86)
7 and 8 (n = 159)	13.56 (5.85)	18.09 (5.57)	11.08 (4.51)	13.15 (5.65)	11.93 (5.16)	10.49 (4.29)	11.61 (4.05)
Group ^a							
Normal weight (n = 382)	15.00 (4.80)	18.12 (4.68)	11.17 (3.80)	13.28 (4.77)	11.02 (4.34)	9.85 (3.59)	9.87 (3.42)
Obesity I (n = 132)	13.58 (4.99)	17.24 (4.86)	11.51 (3.94)	13.26 (4.95)	11.02 (4.50)	9.55 (3.73)	9.89 (3.55)
Obesity II (n = 137)	14.73 (4.94)	18.29 (4.83)	11.48 (3.91)	13.82 (4.91)	11.62 (4.46)	10.75 (3.69)	9.70 (3.50)
Obesity III (n = 106)	13.95 (5.36)	17.29 (5.07)	11.42 (4.12)	13.82 (5.18)	11.99 (4.70)	10.56 (3.91)	11.23 (3.71)

Note: ^a Normal weight (i.e. no diagnosis of obesity and self-report based normal weight), Obesity I (i.e. physician-diagnosed obesity but self-report based normal weight), Obesity II (i.e. physician-diagnosed obesity but self-report based overweight), Obesity III (i.e. physician-diagnosed obesity and self-report based obesity). Means corrected for covariate school type.

The factor *gender* yielded significant main effects in seeking social support, $F(1, 745) = 29.23, p < .001, \eta^2 = .039$, problem solving, $F(1, 745) = 10.76, p < .01, \eta^2 = .015$, palliative emotion regulation, $F(1, 748) = 10.11, p < .01, \eta^2 = .014$, avoidant coping, $F(1, 749) = 21.62, p < .001, \eta^2 = .029$, and stress-related eating, $F(1, 747) = 8.31, p < .01, \eta^2 = .011$. Girls scored higher in seeking social support, problem solving, and stress-related eating. Boys yielded higher scores in palliative emotion regulation and avoidant coping (see Table 2).

Finally, for *grade level*, there was a main effect for media use, $F(2, 748) = 20.66, p < .001, \eta^2 = .054$. All simple comparisons were statistically significant, indicating an increase in media use as coping strategy from 2nd to 4th graders to 5th and 6th graders to 7th and 8th graders ($ps \leq .001$ Bonferroni adjusted; see Table 2).

Interaction Effects

For *seeking social support*, the main effects of gender and group were modified by significant interactions between group and gender, $F(3, 745) = 3.14, p < .05, \eta^2 = .013$, as well as by interactions between group, gender, and grade level, $F(6, 745) = 2.23, p < .05, \eta^2 = .018$. Girls scored higher than boys in all groups ($ps < .001$) except for obesity group III (physician-diagnosed obesity and self-report based obesity). In obesity group III (physician-diagnosed obesity and self-report based obesity), girls and boys reported similar scores. In this group in particular, adolescent girls (i.e. grades 7 and 8) reported significantly lower seeking social support than adolescent girls in the normal weight group (no diagnosis of obesity and self-report based normal weight, $p < .01$ Bonferroni adjusted,⁶ see Figure 2).

For *palliative emotion regulation*, the main effect of gender was modified by a significant interaction between gender and grade level, $F(2, 748) = 4.21, p < .05, \eta^2 = .012$. Gender differences were strongest in grades 7 and 8, with boys ($M = 13.97, SD = 4.34$) scoring higher than girls ($M = 11.93, SD = 4.40, p < .01$). Additionally, there was a significant interaction between group and grade level, $F(6, 748) = 2.55, p < .05, \eta^2 = .021$. In grades 5 and 6, palliative emotion regulation was lower in obesity group I (physician-diagnosed obesity but self-report based normal weight, $M = 12.49, SD = 5.00$) than in obesity group II (physician-diagnosed obesity but self-report based overweight, $M = 14.66, SD = 3.88, p < .05$ Bonferroni adjusted).

The main effect of gender on *stress-related eating* was modified by a significant interaction between gender and grade level, $F(2, 747) = 3.98, p < .05, \eta^2 = .011$. The differences concerning stress-related eating between girls and

⁶ Post-hoc tests for the location of interaction effects were adjusted for multiple testing (Bonferroni) based on the number of groups compared.

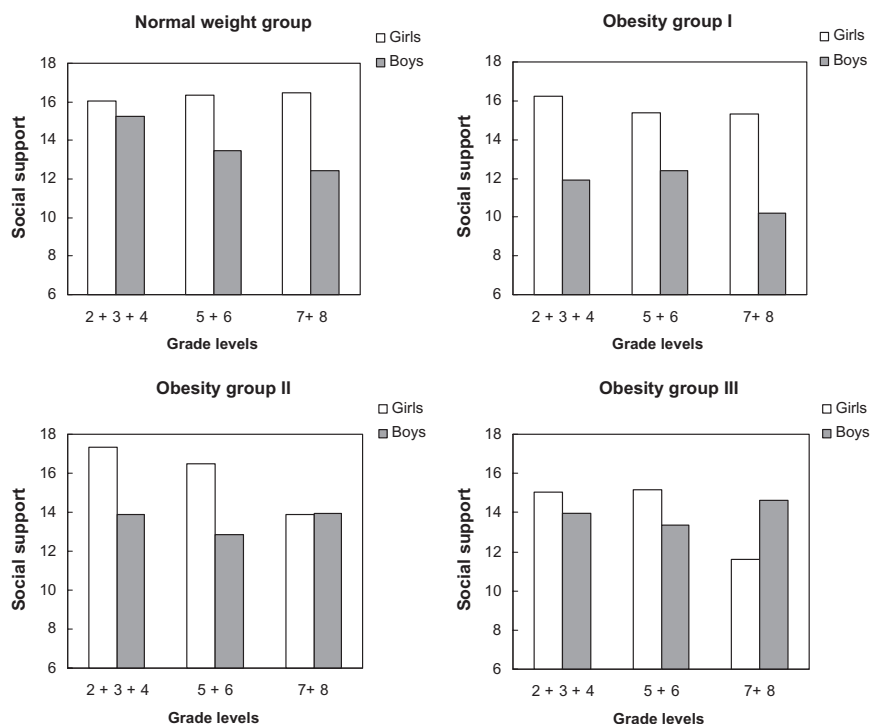


FIGURE 2. Seeking social support as a function of group, gender, and grade level. Normal weight group: no diagnosis of obesity and self-report based normal weight; Obesity group I: physician-diagnosed obesity but self-report based normal weight; Obesity group II: physician-diagnosed obesity but self-report based overweight; Obesity group III: physician-diagnosed obesity and self-report based obesity.

boys were strongest in grades 7 and 8. Girls ($M = 11.28$, $SD = 3.45$) in these grade levels reported significantly higher scores than boys ($M = 9.11$, $SD = 3.10$, $p < .001$).

The main effects of group and grade level for *media use* were modified by a significant interaction between group and grade level, $F(6, 748) = 4.07$, $p < .001$, $\eta^2 = .033$. Increasing media use with age was visible in the normal weight group (no diagnosis of obesity and self-report based normal weight) and obesity group III (physician-diagnosed obesity and self-report based obesity), but, in obesity group III, they were on a higher level. Furthermore, the effects were modified by a significant interaction between group, gender, and grade level, $F(6, 748) = 2.51$, $p < .05$, $\eta^2 = .020$ (see Figure 3). There was a difference for adolescent boys (grades 7 and 8) between obesity group III

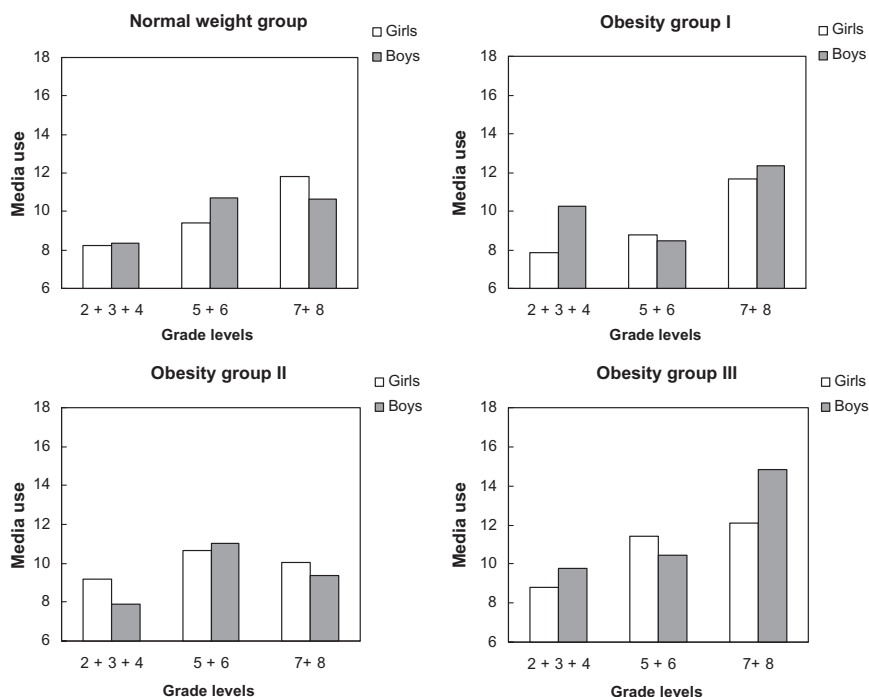


FIGURE 3. Media use as a function of group, gender, and grade level. Normal weight group: no diagnosis of obesity and self-report based normal weight; Obesity group I: physician-diagnosed obesity but self-report based normal weight; Obesity group II: physician-diagnosed obesity but self-report based overweight; Obesity group III: physician-diagnosed obesity and self-report based obesity.

(physician-diagnosed obesity and self-report based obesity) and obesity group II (physician-diagnosed obesity but self-report based overweight, $p < .05$ Bonferroni adjusted) and the normal weight group (no diagnosis of obesity and self-report based normal weight, $p = .07$ Bonferroni adjusted). Adolescent obese boys who consider themselves to be obese reported the highest amount of media use as strategy of coping with the social stressor.

DISCUSSION

The main goal of the study was to investigate whether children and adolescents with obesity as compared to those who are not obese differ with regard to coping strategies. In terms of obesity, physician diagnoses as well as self-reports on height and weight were considered. Therefore, special reference was

made to self-report based obesity status. According to their self-evaluations concerning height and weight, physician-diagnosed obese participants were divided into three groups: obesity group I (i.e. physician-diagnosed obesity but self-report based normal weight, 35.2%), obesity group II (i.e. physician-diagnosed obesity but self-report based overweight, 36.5%) and obesity group III (i.e. physician-diagnosed obesity and self-report based obesity, 28.3%).

At first glance, the difference between self-report categories (Cole et al., 2000; Kromeyer-Hauschild et al., 2001) and physicians' diagnoses for two-thirds of our obese participants seemed to be surprising. In fact, other studies reported related findings but with different operationalisations of subjective obesity-related measures. Relying on weight appraisals, Kurth and Ellert (2008) found that, of the obese boys and girls studied, only about 60 per cent of the girls and 32 per cent of the boys considered themselves to be "far too fat". Viner et al. (2006) reported that for boys 60 per cent of those overweight and 30 per cent of those who were obese classified their weight as "about right". For girls, 34 per cent of those overweight and 9 per cent of those who were obese thought their weight was "about right". These findings show that physicians' diagnoses and self-reports on weight-related statements are not necessarily the same. Moreover, euphemising overweight can even have a positive impact on well-being (Kurth & Ellert, 2008). In our study, the combination of obesity status and self-evaluation of relative body weight (as indicated by BMI based on self-reports) was also related to coping style as a relevant variable in the context of well-being.

Obese children who perceive themselves as overweight or obese (obesity groups II and III) reacted with more *stress-related eating* to a social stressor than healthy controls and obese children who perceive themselves as normal weight (obesity group I). In line with our findings, Lindel and Laessle (2002) revealed that, in response to life's daily stress, overweight children reacted more often with eating than normal weight children. For a non-obese sample of about 1,000 children and adolescents between 8 and 13 years, Jenkins, Rew, and Sternglanz (2005) reported perceived stress to correlate with unhealthy eating behavior and with eating as a coping reaction. They used one item to assess eating as a coping reaction and therefore suggest that a better scale is needed containing more items. Furthermore, they recommend coping promotion to prevent unhealthy eating behavior as a way of coping. In addition, in our study, the stress-related eating scores of girls were found to be higher than the scores of boys—especially in adolescence—using the new coping subscale. For families, Hanson, Klesges, Eck, Cigrang, and Carle (1990) found mothers and children in conflictual families to weigh more. The authors speculated that they use inadequate ways of coping like overeating to deal with family troubles. Girls might take over the coping style of their mothers by watching them. Investigation of this coping style in children and adolescents is limited.

Media use as a coping strategy in general increased with age (i.e. grade level). However, obesity group III (physician-diagnosed obesity and self-report based obesity) reported significantly higher media use than healthy controls and obese children who perceive themselves as normal weight (obesity group I). Those who reported their obesity realistically seemed to hide more behind TV or computer games compared to normal weight children and obese children who euphemised their obesity. Faith, Leone, Ayers, Heo, and Pietrobelli (2002) found that children who were criticised because of their weight showed reduced physical activity. Whereas several studies (e.g. Dennison, Erb, & Jenkins, 2002; Grund, Krause, Siewers, Rieckert, & Müller, 2001) have reported on media consumption of obese children and adolescents, studies that consider media use as a way of coping are rare (e.g. Lohaus, Ball, Klein-Hessling, & Wild, 2005). Further research is needed to understand whether adolescent obese boys who perceive themselves as obese are more criticised by peers and therefore perceive their relative weight (i.e. obesity status) more realistically than obese participants who reported normal weight. As a consequence, obese boys who perceive themselves as obese may engage in extensive media use as a non-adaptive strategy in coping with obesity and daily stressors (see also Puhl & Brownell, 2003).

The findings that girls reported greater *seeking social support* and *problem solving*, whereas boys reported higher *avoidant coping* were in accordance with Eschenbeck et al. (2007). For *seeking social support*, interaction effects between obesity group and gender as well as between obesity group, gender, and grade level revealed that obesity group III (physician-diagnosed obesity and self-report based obesity) is the only group with no gender differences with regard to social support. Adolescent obese girls who perceived themselves as obese reported especially low social support. Recently, Eschenbeck, Kohlmann, Dudey, and Schürholz (2009) reported higher risks (odds ratio, OR = 2.00) for internalising disorders (i.e. anxiety disorders, depressive disorders) for children and adolescents with physician-diagnosed obesity when compared to children and adolescents without obesity. Compared to boys with obesity, girls with obesity showed even higher risks for internalising disorders (girls with obesity: OR = 2.47; boys with obesity: OR = 1.65). In addition, in early adolescence the risk associated with obesity for internalising disorders (especially anxiety) was even higher than in younger children with obesity (ORs = 2.56 vs. 1.40). Reduced social support may play a mediating role between obesity and the development of psychological impairment. Further studies should investigate interrelations between seeking social support and internalising disorders in obese adolescents, especially in girls. Educating obese children and adolescents (especially adolescent girls) to seek social support may help prevent internalising disorders like anxiety or depression.

For *palliative emotion regulation*, in line with Hampel and Petermann (2005), boys scored higher than girls, and the differences increased from the

youngest age group to the oldest age group. Moreover, obese early adolescents (grades 5 and 6) who perceived themselves as normal weight (obesity group I) reported lower palliative emotion regulation (e.g. relaxation) than obese early adolescents who perceived themselves as overweight. Similar to media use, this group again showed a more beneficial coping pattern with less use of an inactive way of coping. Consistent with this finding, Eschenbeck et al. (in press) have shown associations between palliative emotion-regulation, media use, and avoidant coping in general.

To summarise, the present study provides evidence for differences in coping strategies even within the group of obese children and adolescents. Obese children and adolescents who have unrealistically positive self-evaluations of their weight report coping strategies similar to those reported by normal weight children and adolescents. It is assumed that positive self-evaluations of body weight prevent obese adolescents in particular from the reliance on coping strategies associated with physical inactivity, withdrawal, and social isolation. Further research should extend the perspective to eating and media use as coping strategies among obese children and adolescents. On the one hand, obese boys and girls, especially in adolescence, appear to rely on coping strategies like media use, stress-related eating, and palliative emotion regulation that may all be related to weight gain. On the other hand, lack of seeking social support, especially in adolescent girls with obesity, may contribute to reduced subjective well-being.

Interventions for the treatment of obesity in children and adolescents may be more beneficial if training in adaptive vs. maladaptive coping strategies with regard to weight-regulation and subjective well-being is included (see Stice, Shaw, & Marti, 2006). For example, adolescent girls could learn to share their problems and seek help in solving them, whereas older boys (especially those who perceive themselves as obese) should be supported to solve their problems actively instead of hiding in front of the TV or computer. Further, girls should find other ways to solve stress than starting to eat.

One limitation of our study is a substantial time interval between the obesity diagnoses by the physician and self-report based BMI. However, physician diagnoses were quite stable over the 3-year period, supporting evidence of the tracking of obesity in children and adolescents (see also Fuentes, Notkola, Shemeikka, Tuomilehto, & Nissinen, 2003). In addition, further studies should investigate if interaction effects can be replicated even though some effects sizes were small. There also might be a bias due to self-selection of the sample. Therefore, we want to point out that we analysed a large community-based sample of children and adolescents and operationalised obesity by physician diagnoses according to the ICD-10 classification. Moreover, we considered self-evaluations of weight status. Finally, we assessed general coping strategies and two weight-related coping strategies. Future studies could also take different stressful situations into account. We

investigated coping in response to a social “argument with a friend”-stressor and not to a more private academic “problems with doing homework”-stressor for we assumed that the social setting might be more important in relation to obesity.

Unexpectedly, there was no difference for avoidant coping between normal weight and obese children and adolescents or within the group of obese at all. Still, obese children and adolescents could be divided into three groups due to their self-report based obesity status, which could perhaps be explained by repressing or avoiding the fact of being obese. However, differences within avoidant coping styles regarding obesity might be studied in more detail with a more specific coping scale relying on obesity-related stressors.

For children and adolescents with obesity, we recommend that nutrition, physical activity, and stress regulation be studied simultaneously. Actually, we found evidence that inactivity-related coping (i.e. media use and palliative emotion regulation) and eating were ways of coping overrepresented among children and adolescents with obesity. Further research is needed on the costs and benefits of obese children and adolescents who evaluate themselves as normal weight. There are gender-specific impairments in coping in the group of obese children. Obese boys who perceive themselves as obese tend towards more media use, whereas girls who perceive themselves as obese report less social support. Those two groups in particular should be guarded from social isolation which may in turn be crucial for the well-being of obese children and adolescents. Hence, coping should be considered as a basic principle when treating obesity.

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