Research Article

Weight-Stigma and Body Satisfaction among Preschool Children

Brigitte Jenull[1*], Carlotta Mayer[1], Phil Knobel[1], Robert Birnbacher[2]

[1]University of Klagenfurt, Carinthia, Austria

[2]Department of Children and Adolescent Medicine, Hospital Villach, Austria

[*]**Corresponding Author:** Brigitte Jenull, University of Klagenfurt, Carinthia, Austria

Citation: Brigitte Jenull, Carlotta Mayer, Phil Knobel, Robert Birnbacher. Weight-Stigma and Body Satisfaction among Preschool Children. Journal of Pediatrics, Perinatology and Child Health 5 (2021): 112-125.

Abstract

Introduction: The worldwide obesity pandemic has far reaching consequences for the overweight individual. Overweight itself can lead to impaired physical health, the associated weight stigma to impaired mental health.

As weight bias starts as early as in preschool age, it is important to find out what sociodemographic and psychosocial factors promote weight stigma in children and how to prevent them.

Methods: Within the DONUT-project 282 children between the age three to seven were interviewed about their preference of different sizes in playmates and the adjectives they attributed to normal and overweight figures. Answers have been correlated with the child's weight, perceived and ideal body size, gender, and age.

Results: Weight stigma is evident throughout the sample, while older children tend to show a higher weight bias than younger children. Girls were found to display a stronger weight bias than boys. A higher children's weight showed a positive correlation with association of negative adjectives to the overweight target figure. A lower perceived or ideal body size was associated with higher negative correlations towards overweight individuals. There was no body satisfaction effect on expressed weight stigma.

Discussion: Our findings provide further evidence about the relationship between different sociodemographic and psychosocial constructs. This relationship is difficult and needs more research. The importance of our results for early prevention programs to reduce weight stigma in children and society is discussed.

1. Introduction

1.1 Overweight as a global phenomenon

The increase of overweight and obesity in adults has become a global phenomenon [1] and is thus called the "obesity pandemic" [2-5] to underline its global and dispersing character. Since 1980 the prevalence of obesity almost tripled worldwide [6, 7]. In 2016, 39% of adults over the age of 18 were considered overweight and 13% obese worldwide [7]. These numbers vary from country to country. For example, the prevalence for adult overweight and obesity in the US in the year 2016 was 70% and 36% respectively, while in India the numbers are much lower with 19% and 4% [8]. On a global level, obesity accounts for 8% of all deaths per year [9]. Overweight is hereby defined as a Body-Mass-Index (BMI) of over 25, while obesity of over 30 [10]. The BMI is defined as an individual's weight divided by the squared height. The dramatic increase does not only apply to adults but also to children all over the world [11]. The number of overweight and obese children between the age 5 and 19 increased from 4% in 1975 to 18% in 2016 globally [10].

This global trend is also evident in Austria [12]. Between 1973 and 2007 the mean Austrian BMI increased by 1 across any educational group and gender, even though the increase is much higher among low educated individuals than in other educational groups. There is however an interaction effect as the increase in low-educated females is higher than in low-educated males [13]. In 2016, 54.3% of all Austrian adults had to be considered overweight following the WHO definition and 20.1% had to be considered obese [14]. Gender differences reveal that there are more males overweight than females (61.8% to 46.8% respectively), while in the obese category there is not a huge difference (21.9% to 18.3% respectively). By 2030, up to one third of all adults will be considered obese following a projection [15]. As Austria does not participate in the WHO European Childhood Obesity Surveillance Initiative (COSI), there is no comparable data for prevalence of overweight in children available [15]. Still, following a study from 2006 around 7.7% of 6-year-old boys and 7.6% of 6-year-old girls were considered overweight and 9.2% of the boys and 6.8% of the girls obese.

1.2 Consequences

Overweight and obesity have large consequences on an economic level for society. For Austria, the direct costs alone aggregate to an estimated 227 to 1.138 million euro each year, which accounts for 1 to 3 percent of the entire costs of the health system [15]. From a lifetime perspective, every obese individual adds costs between 160.000€ and 200.000€ to the social security system in Germany [16]. In OECD countries, 8.4% of the health budget will be spent to treat the consequences of overweight over the next thirty years [17]. The economic consequences of overweight and obesity are huge, still the consequences for an overweight or obese individual are much more far-reaching. The increased risk for physical health is well-known. Many diseases like several types of cancer, type 2 diabetes, hypertension or heart diseases and a higher risk for disability are associated with overweight and obesity [18]. There is also an increased mental health risk due to body dissatisfaction [19], (self) stigmatization [20], [...] less life satisfaction [21] and – for women – less career opportunities [22]. The interaction between nutrition, physical activity, as well as physical and mental health form several vicious cycles on the nutritional level [23], the physical activity level [24] and the mental health level [25] which makes it more and more difficult for an

individual to turn back to a healthy lifestyle.

1.3 Weight bias

Mental health problems seem to be linked to the so-called weight bias or obesity stigma. Weight bias is the negative attitudes and beliefs expressed by stereotypes or prejudices towards others because of their weight [26], while obesity stigma is a step ahead and is related to action, such as exclusion or marginalization which in turn can lead to inequalities and the above-mentioned negative outcomes on mental health [26]. Weight discrimination has been examined from the early 1990s in work environments [27-30] and ever since a growing body of literature emerged around this topic. Even though the direction of this effect remains unclear, high perceived weight stigma is significantly related to a decrease in mental health, which seems to be moderated by body weight and BMI [31]. Weight stigma and its consequences are not only evident in adult settings. A lot of studies with school children provide findings that as early as in preschool, children and adolescents experience weight stigma and its negative impacts for the individual's life course [32-35]. Especially in children's and adolescents' experiences, weight bias can impact individuals' well-being and educational course [34] which in turn has negative consequences for career options or personal life decisions. The question from which age weight stigma becomes evident has been examined in several studies with preschool children. These studies show that as early as 3 years children tend to befriend normal weight children rather than an overweight child or attribute negative adjectives or attribute less control to overweight figures [17, 36, 37]. To understand how weight-stigma can be targeted with prevention and intervention strategies, it is important to figure out which demographic, psychosocial or physical factors are linked to negative perceptions and how the

incorporation of negative stigma can be overcome to avoid self-stigma and negative mental health outcomes.

So far, several attribution task studies with children have been carried out [38, 39]. The set-up is always similar. Children have to choose from a set of target figures, one for each positive or negative attribute or adjective or positively or negatively framed story. Negative attributes have been associated much more with overweight figures than with normal or underweight figures. Some of those studies investigated the interplay of weight stigma and gender [40, 41], children's weight status [41, 38] ethnicity [38] or age [38] as individual children's characteristics.

1.4 Weight stigma and body satisfaction

A relation between weight stigma and body satisfaction has already been confirmed in adults [42-44]. To date, studies have focused on self-perceived weight stigma, raising the question of who stigmatizes. When people classify others into groups based on certain characteristics, this phenomenon is called social categorization [45]. Social categorization helps us to decide more quickly how to respond to people with certain characteristics [46]. With this categorization, we compare the characteristics of another individual with ourselves, which makes them become members of our own group or of a group of others. People tend to treat members of their own group better than others [47]. At the same time, members of other groups are perceived in such a distorted way that they seem homogeneous and their interindividual differences are ignored [48]. If this concept is applied to the weight stigma, it could be assumed that people who are themselves normal weight or underweight perceive overweight people more negatively than other normal or underweight people. People who are themselves overweight should therefore

have a more positive image of other overweight people. Other findings reveal a connection between mental health stigma and contact with those affected [49]. As soon as someone from the personal environment was affected by a mental illness and thus had more experience with stigmatized persons, fewer negative stereotypes were retained. This result can also be transferred to the weight stigma. People who have overweight peers or family members should stigmatize other overweight people less through their personal experience with members of the stigmatized group. Overweight people should therefore also have fewer prejudices against other overweight people.

In our study, we want to replicate previous research on children´s weight stigma by examining their selection of overweight children as playmates and best friends. It was expected that they would choose overweight figures as playmates and best friends less than they would choose average and thin figures. The second aim of this study was to examine how children would endorse adjectives to three target figures. It was hypothesized that children would endorse negative stereotypes more often for overweight than average or thin figures. The third aim was to examine body perception and body satisfaction. We hypothesize that children with a lower body satisfaction show a stronger weight stigma than do children with a healthier body concept. We further hypothesize that children with a thinner ideal target figure tend to show a stronger weight stigma than other children. We do not expect any differences between boys and girls.

2. Methods

This study is part of the DONUT-project approved by the authors University's Research Ethic Board (2018-018). The DONUT-project is a long-term study

examining biopsychosocial risk factors of childhood overweight. The target group of this study consisted of 282 preschool children, aged three to seven, attending kindergartens in a rural area of Carinthia (Austria).

2.1 Procedure

The data collection took place between February and July 2018. The researchers went to the kindergartens and presented themselves and the procedure to the children. Successively, each child went into another room with two female graduate students and was invited to participate. Some questions about popular games and leisure activities were asked to establish a good relationship with the child. The interview was divided into three parts: 1) Playmate preference task, 2) Adjective attribution task, and 3) Children's body perception and satisfaction task.

2.2 Measures

2.2.1 Playmate Preference Task: For the playmate preference task, we used a three-silhouette method as it was used by Cramer and colleagues [50]. They were chosen from the 7-point figure rating scale (Figure 2, figure 4, figure 6) representing three weight categories (underweight, normal, overweight). Two series of pictures were created, one for girls and one for boys. After presenting the pictures, the children were asked to pick up the one they preferred as a playmate and one they would not like to be friends with. According Birbeck and colleagues' procedure [51] the interviewer asked two more questions: "Which child would you invite to your birthday party?", "Which child would you not invite to your birthday party?" Answers were coded as 1 (=underweight), 2 (=normal weight) and 3 (=overweight).

2.2.2 Adjective Attribution Task: For the adjective

attribution task, we used a list of 18 attributes (Table 1) according to Musher-Eizenman and collegues (2004) [37]. The adjectives were read out to the children, e. g., "Which of the children do you think is ugly?' and they then had to point to one of three figures to which this applies. Again, answers were coded as 1 (= underweight), 2 (=normal weight) and 3 (=overweight).

2.2.3 Children's body perception and satisfaction task: For the first part of the tasks the children were presented seven target figures from the Children's Body Image Scale [52]. They were asked to choose one figure that looks the most like to them and one figure that they would most like to look like. Those questions were taken from a questionnaire measuring body image [53]. For the measurement of body satisfaction, the difference between ideal and actual assessment was formed [54, 55]. The accuracy of a child's perception was calculated using a two-fold measure. The dissatisfaction with one's own body is greater the more the actual and ideal figure differs from each other. Satisfaction with one's own body should exist when the ideal and actual assessment of the figure matches. After the procedure, the children were given small rewards like stickers or balloons. Children's weight status and height have been documented beforehand.

2.2.4 Data Analysis: For the first step of data analysis the target figures of the first task have been aggregated into dichotomous variables. With this procedure the underweight and normal weight target figure was merged into one option (coded as 0) and the overweight target figure the other (coded as 1). Afterwards, all attributes have been explored separately. In the next step of the analysis, attributes were added up to a negative and a positive variable. Mean value analyses, χ^2-tests as well as Pearson correlations have been

conducted to identify correlations and differences. Statistical analysis has been conducted with SPSS Statistics 26.

3. Results

3.1 Description of sample characteristics

The sample consists of $n = 147$ girls and $n = 135$ boys with a total of $N = 282$ children. The children's age varied from three to seven years ($M = 5$, $SD = 1$). Most children were at normal weight ($n = 228$, 81.1%). $N = 19$ children (6.8%) are classified as underweight due to their percentile value, $n = 34$ children (12.1%) are overweight. One child's weight classification could not be measured because she was in a wheelchair. Most of the children lived (94.3%) with both parents. The average net equivalent income of the families was 1463.50€ ($SD = 493.48$€). The classification of socioeconomic status according to Lampert [56] showed that 10.6% have a low, 81.3% have a medium and 8.1% have a high socioeconomic status.

3.2 Playmate preference task and adjective attribution task

Our results show that negative attitudes about overweight are present in young children. Two-thirds of children surveyed would not want to be friends with or invite an overweight child to a birthday party. Table 1 shows the 18 adjectives and how often they have been selected for the under-/normal weight target figure and for the overweight target figure respectively. χ^2-Tests have been conducted to test whether frequencies differ significantly from each other. Adjectives with a positive connotation have been attributed significantly more frequent to the under-/normal weight target figure, while adjectives with a negative connotation have been attributed significantly more frequent to the overweight target figure. The results show clear differences in the

attribution of these adjectives. Two adjectives, *sloppy* and *sad*, showed no significant differences. The attribution of the figures to the individual adjectives was dichotomously coded: If the under- or normal weight figure was selected, 0 was coded. If the overweight figure was selected for an adjective, 1 was used. To create an overall variable from the information on the individual adjectives, the dichotomous values (0 for the underweight or normal weight Figure, 1 for the overweight figure) were aggregated. A distinction was made between adjectives with positive and negative meaning. Figures 1 and 2 indicate the frequency of selected overweight target figure over normal-/underweight target figure. A different y-axis scale has been used for better clarity of the results.

Adjective Attribution Task	Under-/normal weight		Overweight		χ^2
	n	*%*	*n*	*%*	
Playmate Preference Task					
Friendship	243	86.2	39	13.8	147.57**
No friendship	95	33.7	187	66.3	30.01**
Invitation	247	87.6	35	12.4	159.38**
No invitation	91	32.3	191	67.7	35.46**
Adjective Attribution Task					
Ugly	76	27.6	199	72.4	55.02**
Pretty	247	89.8	28	10.2	174.40**
Sloppy	134	48.7	141	51.3	0.18
Neat	246	89.5	29	10.5	171.23**
Popular	222	80.7	53	19.3	103.86**
Unpopular	107	38.9	168	61.1	13.53**
Mean	119	43.3	156	56.7	4.98*
Nice	248	90.2	27	9.8	177.60**
Active/ energetic	226	82.2	49	17.8	113.92**
Lazy/ idle	99	36	176	64	21.56**
Happy	251	91.3	24	8.7	187.38**
Sad	141	51.3	134	48.7	0.18
Naughty	111	40.4	164	59.6	10.26*
Well-behaved	252	91.6	23	8.4	190.70**

Note: For the first four adjectives: *n* = 282, for the remaining: *n* = 275. * *p*<.05, ***p*<.01.

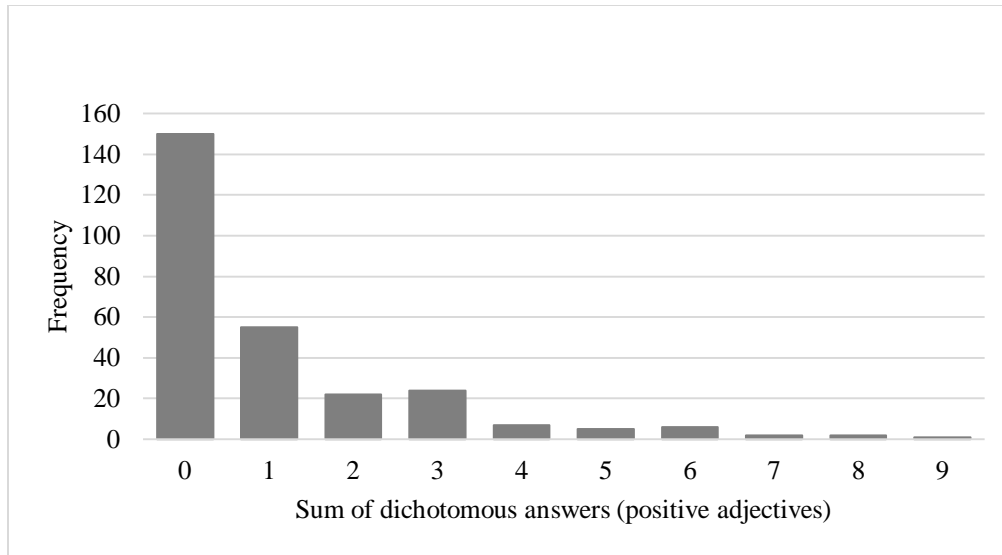**Table 1:** Frequencies of selected target figures for each adjective.

Figure 1: Frequency of the summed values of the positive adjectives.
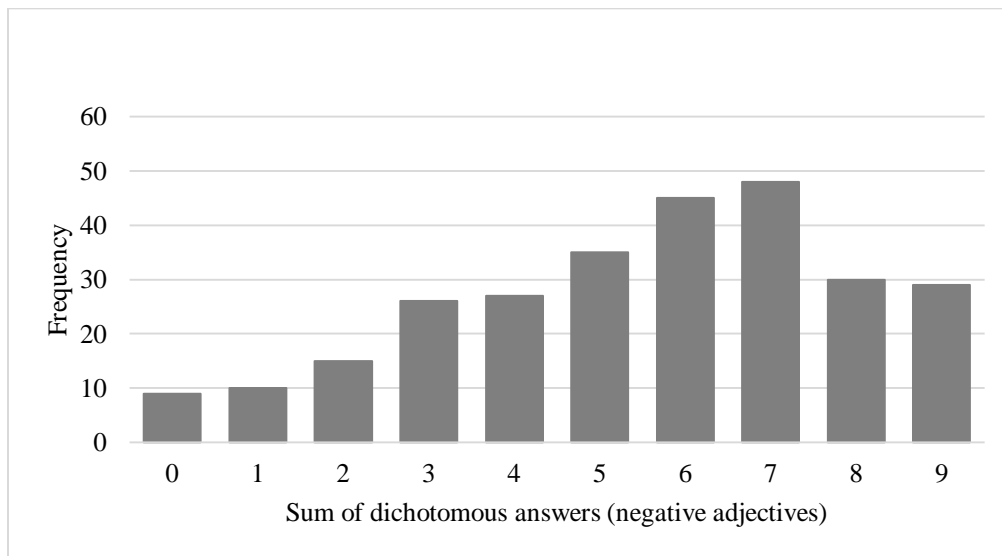

Figure 2: Frequency of the summed values of the negative adjectives.

As we can see in Figure 1, mainly the under- or normal-weight figures have been chosen for the positive adjectives instead of the overweight figure. For an attribution of the negative adjectives, the overweight figures have been chosen more often (Figure 2). Attributions of overweight figure to negative and positive adjectives show a high negative correlation ($r = -.757$, $p < .001$). The fact that the overweight figure has been selected more often for negative adjectives goes along with the fact that it was less likely to be attributed to positive adjectives.

3.3 Age differences

The sample was divided into two groups based on the median age. Comparison of mean values show further differences between children under and from the age of five. A Levene-Test for homogeneity of variances was significant for the sum of attributions to negative adjectives ($F_{(86,187)} = 5.24$, $p <.05$), for that reason a Welch-Test was conducted. Children under the age of five attributed negative adjectives significantly less often to overweight target figures ($M = 3.98$, $SD = 2.421$, $n = 87$) than children from the age of five ($M = 6.21$, $SD = 2.007$, $n = 188$), $t_{(142.75)} = 7.486$, $p<.001$. Cohen's d is $d = 1.008$ and displays a large effect size [57]. The same analysis has been conducted for positive adjectives which also revealed heterogeneity of variances ($F_{(86,187)} = 38.36$, $p = <.001$). Children from the age of five attributed positive adjectives less often to the overweight target figure ($M = .57$, $SD = 1.250$, $n = 188$) than children under the age of five ($M = 2.22$, $SD = 1.895$, $n = 87$), $t_{(118.61)} = -7.124$, $p < .001$. Again, this displays a large effect size with $d = .994$.

3.4 Gender differences

We found gender differences in the attribution of positive adjectives. As no homogeneity of variances is found ($F_{(143, 130)} = 8.86$, $p <.05$), a non-parametric test displayed that girls attributed positive adjectives less often to the overweight target figure ($M = .88$, $SD = 1.465$, $n = 144$) than did boys ($M = 1.32$, $SD = 1.906$, $n = 131$), $t_{(243.36)} = -2.124$, $p<.05$. This displays a small effect size with $d = -.26$.

3.5 Children's weight status

Children's weight status displayed a positive correlation with the selection of an overweight figure to negative adjectives ($r = .316$, $p <.001$) and a negative correlation with selection of positive adjectives ($r = -.291$, $p <.001$).

3.6 Children's body perception and satisfaction task

3.6.1 Body perception task: Attributions of negative adjectives to the overweight figure show negative correlations with the child's perceived body shape ($r = -.244$, $p <.001$) and ideal body shape (r = -.344, $p <.001$). The thinner children perceive themselves or wish to look like, the stronger the attribution of negative adjectives to overweight target figures. Positive correlations were found between the attribution of underweight/normal weight target figures to positive adjectives and perceived body shape ($r = .369$, $p <.001$) and ideal body shape ($r = .267$, $p <.001$). Children who attribute positive adjectives to the under- or normal weight figure, perceive themselves or their ideal body shape as thin.

3.6.2 Body satisfaction: Calculating the body satisfaction score using the difference between perceived body shape and ideal body shape as body satisfaction, those effects vanish (discrepancy value). Body satisfaction and attribution of positive adjectives to overweight bodies show a negative nonsignificant correlation ($r = -.070$, $p >.05$). The thinner the children wanted to be, the more they attributed negative adjectives to overweight figures, although this effect was not significant ($r = .069$, $p >.05$).

4. Discussion

The present study confirms that even at a very young age children contribute to the stigmatization of overweight individuals. The negative attitudes pre-schoolers had toward overweight individuals were demonstrated in our playmate preference task. Normal or underweight figures were chosen as desirable playmates. Our participants like overweight persons less and wish to interact with them less compared with normal-/underweight peers. Almost 90% of our

participants chose the normal-/underweight figure as a potential playmate and wanted to invite her or him to a party. On the other hand, only about 10% want to befriend an overweight child. It should be noted that this task is often used with a young target group, but there is no evidence about the reliability and validity of this measure. Based on our survey, we cannot say what causes this friendship selection and what the children's actual choice of friends looks like.

Consistent with previous research [50], negative attitudes about overweight persons are present in very young children. Our pre-schoolers describe overweight people predominantly as ugly, unpopular, and lazy. Weight stigma is already developed in children from the age of three, while it is significantly stronger pronounced in children from the age of five. These findings are in line with several other studies which show that weight stigma in children is evident but there is an increase in weight stigma severity between the age three and six [38, 58, 59, 60]. Harrison et al. found age differences even though the age range of the participants was less than two years [40]. As we could show in Figure 1 and 2, weight stigma does not only include that more negative attributes, but also fewer positive attributes are associated with an overweight individual. In our study girls displayed stronger weight stigma than boys in attributing fewer positive adjectives to the overweight target figure. The evidence for gender differences in weight stigma is mixed. Some studies show differences [60], such as boys stigmatize individuals based on weight stronger than girls, the latter did rather stigmatize overweight boys than overweight girls [38]. However, there are a lot of studies where no gender effect is found [40, 61, 62]. For example, Patel et al. found no gender effect in providing help to overweight peers [63]. This shows that the

connection between gender and weight stigma is much more complicated and more research must be done in this area. However, weight stigma at such a young age has implications for anti-stigma campaigns. Parents and teachers should be aware of their responsibility and their attitude should be one of openness, acceptance, and tolerance towards diversity. The media must also be held accountable. In numerous series, we see overweight people portrayed as funny, but lazy and unsuccessful [64].

Children's weight status revealed that children with a higher weight selected overweight target figures more often to negative adjectives and less often for positive adjectives than children with a lower weight. There is so far not a lot of evidence for the influence of children's weight status and expressed or implicit weight bias. In the study of Patel et al. children with a higher BMI perceived an overweight target figure as more negative than children with a lower BMI and were less likely to select overweight figures as playmates [63]. Other studies show no influence of the child's BMI [38]. Children who perceive themselves as thinner, or who have a thinner body ideal, associated the overweight target figure more often to negative adjectives and the underweight/normal weight target figure more often with positive adjectives. These findings are in line with a study from Spiel et al., where the perceived body size of children positively predicted the figure size selected for positive characteristics [62].

4.1 Limitations

As mentioned earlier, our survey procedures must be viewed critically. Does the playmate preference task really measure the choice of friends? Does the difference between perceived body shape and ideal body shape really reveal body satisfaction? Although

the difference between ideal- and self-image is often used as a measure of body satisfaction, it is questionable whether this measure is already appropriate for children. A qualitative study approach, asking children about attitudes toward overweight and normal weight friends and their body image could provide new or more in-depth insights. Furthermore, generalization of our study results is limited. We targeted children in a rather young, rural area in Carinthia, the federal state in Austria with the lowest population density in Austria.

4.2 Future directions

Addressing weight stigma properly can have a positive outcome for both overweight individuals and society. As the findings for gender differences are very mixed, there is an urgent need to do more research in this field to get a better understanding of the mechanisms, that explain the link between gender on the one side and weight stigma on the other side. An interesting field of research is to explore the link between self-stigma, stigma experience and body (dis-)satisfaction further. In other fields of research, the relationship between anticipated or experienced stigma and self-stigma is evident [65], which is also important to consider for weight stigma in overweight children, as self-stigma is related to low self-esteem and self-efficacy [66] Corrigan et al. hypothesized a four-stage model of self-stigma with the single steps *aware*, *agree*, *apply* and finally *diminished self-respect* what leads to a "*why try*" attitude which in turn leads to less effort to turn to a healthy lifestyle [67]. If self-stigma is assessed in overweight and obese children, it is possible to tailor prevention or intervention strategies to prevent further health and life consequences at an early stage.

As weight stigma has worsening consequences for the individual [68] it is important to develop and realise strategies to overcome weight stigma in society and self-stigma in overweight and obese individuals. One interesting field for future research is the "fat acceptance"-movement, which tries to reframe common perceptions and beliefs about overweight people, and its impact on body self-perception and body satisfaction. There is preliminary evidence that body positive framed messages reduce weight bias in individuals [69] and that social media can enhance a positive body image at population level [70]. To further investigate this topic, both the positive influence of self-acceptance on mental health must be considered, but the negative effects on physical health of overweight individuals should not be forgotten. Weight stigma is a huge problem overweight and obese individuals have to face in a lot of spheres of daily life. As it is already evident in preschool children it is important to understand the social and psychological characteristics that are linked to weight stigma to address it properly in prevention or intervention programs. This is especially important to help overweight and obese people to get out of the earlier mentioned vicious cycle what is not only of significance on an individual, but also on a societal level as it can lead to mutual understanding, respect and – important for policy makers who might decide about intervention and prevention policies – less expenses in health care settings.

Funding

Acknowledgements

kindergartens for contributing to the DONUT-Project. We also wish to thank the "Verein zur Förderung der Fortbildung und Forschung auf dem Gebiet der Kinderheilkunde", "Stadt-Umland Regionalkooperation Villach" and "LEADER" for financial support.

Conflict of Interest Disclosure

The authors declare no conflict of interest.

References

1. Abarca-Gómez L, Abdeen ZA, Hamid ZA, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. The Lancet 390 (2017): 2627-2642.

2. Berry EM. The Obesity Pandemic-Whose Responsibility? No Blame, No Shame, Not More of the Same. Front Nutr 7 (2020): 2.

3. Roth J, Qiang X, Marbán SL, et al. The obesity pandemic: where have we been and where are we going? Obes Res 2 (2004): 88S-101S.

4. Meldrum DR, Morris MA, Gambone JC. Obesity pandemic: causes, consequences, and solutions-but do we have the will?. Fertil Steril 107 (2017): 833-839.

5. Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. The Lancet 378 (2011): 804-814.

6. Fox A, Feng W, Asal V. What is driving global obesity trends? Globalization or "modernization"?. Global Health 15 (2019): 32.

7. WHO. Obesity and overweight: Key facts (2020).

8. Hannah Ritchie MR. Obesity (2020).

9. Global Burden of Disease Collaborative Network. Global burden of disease study 2017. Seattle, United States: Institute for Health Metrics and Evaluation (IHME) (2018).

10. WHO. Obesity (2021).

11. Di Cesare M, Sorić M, Bovet P, et al. The epidemiological burden of obesity in childhood: a worldwide epidemic requiring urgent action. BMC Med 17 (2019): 212.

12. Hackl F, Halla M, Hummer M, et al. des Gesundheitssystems: Evidenz aus Österreich. Oberösterreichische Gebietskrankenkasse (2010).

13. Großschädl F, Stronegger WJ. Long-term trends in obesity among Austrian adults and its relation with the social gradient: 1973-2007. Eur J Public Health 23 (2013): 306-312.

14. WHO. Prevalence of overweight among adults, BMI>25, age-standardized: Estimates by country (2017).

15. WHO Europe. Nutrition, Physical Activity and Obesity: Austria (2013).

16. Effertz T, Engel S, Verheyen F, et al. The costs and consequences of obesity in Germany: a new approach from a prevalence and life-cycle perspective. Eur J Health Econ 17 (2016): 1141-1158.

17. Vuik S, Lerouge A, Guillemette Y, et al. The Heavy Burden of Obesity. OECD (2019).

18. Djalalinia S, Qorbani M, Peykari N, et al. Health impacts of Obesity. Pak J Med Sci 31 (2015): 239-242.

19. Weinberger N-A, Kersting A, Riedel-Heller SG, et al. Body Dissatisfaction in Individuals with Obesity Compared to Normal-Weight Individuals: A Systematic Review and Meta-Analysis. Obes Facts 9 (2016): 424-441.

20. Puhl RM, Heuer CA. Obesity stigma: important considerations for public health. Am J Public Health 100 (2010): 1019-1028.

21. Kuroki M. Life satisfaction, overweightness and obesity. Intnl. J. Wellbeing 6 (2016): 93-110.

22. Lee H, Ahn R, Kim TH, et al. Impact of Obesity on Employment and Wages among Young Adults: Observational Study with Panel Data. Int J Environ Res Public Health 16 (2019).

23. Hargrave SL, Jones S, Davidson TL. The Outward Spiral: A vicious cycle model of obesity and cognitive dysfunction. Curr Opin Behav Sci 9 (2016): 40-46.

24. Pietiläinen KH, Kaprio J, Borg P, et al. Physical inactivity and obesity: a vicious circle. Obesity (Silver Spring) 16 (2008): 409-414.

25. Romain K, Webb T, Kumar M. Depression and obesity: can the cycle be broken?. BJPsych advances 24 (2018): 132-140.

26. WHO Europe. Weight bias and obesity stigma: Considerations for the WHO European Region (2021).

27. Johnson T. Weight discrimination and hostile work environment: Analysis and implications. Labor Law Journal 46 (1995): 486-491.

28. Paul RJ, Townsend JB. Shape up or ship out? Employment discrimination against the overweight. Employ Respons Rights J 8 (1995): 133-145.

29. Maranto CL, Stenoien AF. Weight discrimination: A multidisciplinary analysis. Employ Respons Rights J 12 (2000): 9-24.

30. Roehling Mv. Weight-Based Discrimination in Employment: Psychological and Legal Aspects. Personnel Psychology 52 (1999): 969-1016.

31. Emmer C, Bosnjak M, Mata J. The association between weight stigma and mental health: A meta-analysis. Obes Rev 21 (2020): e12935.

32. Pont SJ, Puhl R, Cook SR, et al. Stigma Experienced by Children and Adolescents with Obesity. Pediatrics 140 (2017).

33. Christensen S. Weight Bias and Stigma in Children. Journal of Pediatric Surgical Nursing 7 (2018): 72-74.

34. Nutter S, Ireland A, Alberga AS, et al. Weight Bias in Educational Settings: a Systematic Review. Curr Obes Rep 8 (2019): 185-200.

35. Maglica BK, Kardum I, Čulić A. Weight bias towards individuals and groups in young children. Curr Psychol (2019).

36. Kornilaki EN. Obesity Bias in Preschool Children: Do the Obese Adopt Anti-Fat Views? (2014).

37. Musher-Eizenman DR, Holub SC, Miller AB, et al. Body size stigmatization in preschool children: the role of control attributions. J Pediatr Psychol 29 (2004): 613-620.

38. Rex-Lear M, Jensen-Campbell LA, Lee S. Young and biased: Children's perceptions of overweight peers. J Appl Behav Res 24 (2019).

39. Su W, Di Aurelia S. Preschool children's perceptions of overweight peers. Journal of Early Childhood Research 10 (2012): 19-31.

40. Harrison S, Rowlinson M, Hill AJ. "No fat friend of mine": Young children's responses to overweight and disability. Body Image 18 (2016): 65-73.

41. Wasson E. Parental Influence on Weight Biases in School-Age Children (2017).

42. Friedman KE, Ashmore JA, Applegate KL. Recent experiences of weight-based stigmatization in a weight loss surgery population: psychological and behavioral correlates. Obesity (Silver Spring) 2 (2008):

S69-S74.

43. Stevens SD, Herbozo S, Morrell HE, et al. Adult and childhood weight influence body image, and depression through weight stigmatization. J Health Psychol 22 (2017): 1084-1093.

44. Latner JD, Wilson GT, Jackson ML, et al. Greater history of weight-related stigmatizing experience is associated with greater weight loss in obesity treatment. J Health Psychol 14 (2009): 190-199.

45. Dovidio JF, Gaertner SL. Intergroup Bias. In: Fiske ST, Gilbert DT, Lindzey G, editors. Handbook of Social Psychology. Hoboken, NJ, USA: John Wiley & Sons, Inc (2010).

46. Macrae CN, Bodenhausen GV. Social cognition: thinking categorically about others. Annu Rev Psychol 51 (2000): 93-120.

47. Tajfel H. Social Psychology of Intergroup Relations. Annu Rev Psychol 33 (1982): 1-39.

48. Linville PW, Fischer GW, Salovey P. Perceived distributions of the characteristics of in-group and out-group members: Empirical evidence and a computer simulation. Journal of Personality and Social Psychology 57 (1989): 165-188.

49. Yanos PT. Who Stigmatizes?. Written Off. Cambridge University Press (2017): 67-89.

50. Cramer P, Steinwert T. Thin is good, fat is bad: How early does it begin?. Journal of Applied Developmental Psychology 19 (1998): 429-451.

51. Birbeck D, Drummond M. Interviewing, and listening to the voices of, very young children on body image and perceptions of self. Early Child Development and Care 175 (2005): 579-596.

52. Truby H, Paxton SJ. The Children's Body Image Scale: reliability and use with international standards for body mass index. Br J Clin Psychol 47 (2008): 119-124.

53. Ardelt-Gattinger E, Meindl M. AD-EVA: Interdisziplinäres Testsystem zur Diagnostik und Evaluation bei Adipositas und anderen durch Ess- und Bewegungsverhalten beeinflussbaren Krankheiten (Modul 1). Bern (2010).

54. Fallon AE, Rozin P. Sex differences in perceptions of desirable body shape. Journal of Abnormal Psychology 94 (1985): 102-105.

55. Collins ME. Body figure perceptions and preferences among preadolescent children. Int. J. Eat. Disord 10 (1991): 199-208.

56. Lampert T, Müters S, Stolzenberg H, et al. Messung des sozioökonomischen Status in der KiGGS-Studie: Erste Folgebefragung (KiGGS Welle 1). Bundesgesundheitsblatt Gesundheits-forschung Gesundheitsschutz 57 (2014): 762-770.

57. Cohen J. Statistical Power Analysis. Curr Dir Psychol Sci 1 (1992): 98-101.

58. Baxter SL, Collins SC, Hill AJ. 'Thin people … they're healthy': young children's understanding of body weight change. Pediatr Obes 11 (2016): 418-424.

59. Spiel EC, Rodgers RF, Paxton SJ, et al. 'He's got his father's bias': Parental influence on weight bias in young children. Br J Dev Psychol 34 (2016): 198-211.

60. Harriger J, Trammell J, Wick M, et al. Gender and age differences in pre-schoolers' weight bias beliefs and behavioural intentions. Br J Dev Psychol 37 (2019): 461-465.

61. Kilmurray M, Collins SC, Caterson ID, et al. Is Weight Bias Evident in Peer Interactions Between Young and Older Children?. Obesity (Silver Spring) 28 (2020): 333-338.

62. Spiel EC, Paxton SJ, Yager Z. Weight attitudes in 3- to 5-year-old children: age differences and cross-sectional predictors. Body Image 9 (2012): 524-527.

63. Patel SL, Holub SC. Body size matters in provision of help: factors related to children's willingness to help overweight peers. Obesity (Silver Spring) 20 (2012): 382-388.

64. Heuer CA. "Fattertainment" - Obesity in the Media (2020).

65. Hing N, Russell AMT. How Anticipated and Experienced Stigma Can Contribute to Self-Stigma: The Case of Problem Gambling. Front Psychol 8 (2017): 235.

66. Corrigan PW, Larson JE, Rüsch N. Self-stigma and the "why try" effect: impact on life goals and evidence-based practices. World Psychiatry 8 (2009): 75-81.

67. Corrigan PW, Bink AB, Schmidt A, et al. What is the impact of self-stigma? Loss of self-respect and the "why try" effect. J Ment Health 25 (2016): 10-15.

68. Puhl RM, Phelan SM, Nadglowski J, et al. Overcoming Weight Bias in the Management of Patients with Diabetes and Obesity. Clin Diabetes 34 (2016): 44-50.

69. Stewart S-JF, Ogden J. The Role of BMI Group on the Impact of Weight Bias Versus Body Positivity Terminology on Behavioral Intentions and Beliefs: An Experimental Study. Front Psychol 10 (2019): 634.

70. Cohen R, Newton-John T, Slater A. The case for body positivity on social media: Perspectives on current advances and future directions. J Health Psychol (2020): 1359105320912450.