ACTA ODONTOLOGICA SCANDINAVICA
2019, VOL. 77, NO. 6, 452–456
https://doi.org/10.1080/00016357.2019.1588371

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

OPEN ACCESS Check for updates

Distinguishing between global and dental self-esteem in evaluating malocclusions

Jari Taghavi Bayat[a], Jan Huggare[a] and Nazar Akrami[b]

[a]Department of Dental Medicine, Karolinska Institutet, Huddinge, Sweden; [b]Department of Psychology, Uppsala University, Uppsala, Sweden

ABSTRACT

Objective: When dealing with the impact of malocclusion on self-esteem, the terms global and dental self-esteem are sometimes used. Although these terms are related to one another, they do not depict the same concept. The aims of this paper were to explore if the two forms of self-esteem are distinguishable, to find out if they represent different factors, and to investigate how they are related to malocclusion.

Materials and methods: A sample consisting of 150 adolescents, aged 13 years, completed self-assessed measures of Dental and Global Self-Esteem. Orthodontic treatment need for each individual was assessed by the Dental Health Component of the Index of Orthodontic Treatment Need (IOTN-DHC). Data were analysed by factor analyses and a 5 (IOTN-DHC grades) by 2 (global vs. dental self-esteem) ANOVA, with the IOTN-DHC grades as the independent and self-esteem (repeated measure) as the dependent variables.

Results: The factor analyses showed that the two forms of self-esteem, based on the measures, are distinguishable. More importantly, the results of the ANOVA revealed that Dental and Global Self-Esteem are differentially related to IOTN-DHC. Specifically, Dental Self-Esteem varied across IOTN-DHC scale while Global Self-Esteem did not. There was no effect of gender.

Conclusions: Dental self-esteem is related to malocclusion while global self-esteem is not. These findings have implications in areas where the predictive power of dental self-esteem needs to be considered.

ARTICLE HISTORY
Received 26 October 2018
Revised 13 January 2019
Accepted 20 February 2019

KEYWORDS
Adolescent; dental self-esteem; global self-esteem; malocclusion; self-assessed measures

Introduction

The prevalence of malocclusions among children and young individuals is high [1]. Given that the degree of their severity varies, malocclusions can not only lead to increased disposition to injuries in the oral environment and/or deterioration of orofacial function [2–5], but also affect facial aesthetics leading to inferior self-esteem and quality of life [6–8]. Adolescents with malocclusions may evolve strategies of avoidance to reduce the negative feelings associated with their condition [9].

Self-esteem has been suggested as one of the important factors influencing the demand for orthodontic treatment [10–12]. However, a systematic review in 2014 revealed that self-esteem is rarely measured in orthodontic research [13]. The term self-esteem is given a multitude of definitions. In social psychology, the term *global self-esteem* is used to express how people feel about themselves in general terms [14]. Another term used is *self-confidence*, which deals with individuals' assessments of their abilities, personal characteristics or physical attributes and is sometimes equated with self-esteem [15].

When dealing with the impact of malocclusion on self-esteem, the terms global and dental self-esteem are sometimes used, being related to one another but not exactly depicting the same concept [12]. Consequently, these two terms should refer to different aspects of self-esteem when it comes to malocclusions. Thus, the aim of this paper was to explore if these two forms of self-esteem represent different factors, and more importantly, if they are related to the individual's malocclusion differently. The prediction is that this is the case, since global self-esteem should per definition not be, or insignificantly at most, affected by the type of malocclusion. A possible disparate relation between the two forms of self-esteem and malocclusion would highlight the importance of considering specific forms of self-esteem (conditions-specific such as dental self-esteem) in the process of evaluating treatment need and outcome.

Materials and methods

Subjects

The study included 150 Swedish adolescents aged 13 years, accumulated from the Uppsala City population registry

CONTACT Jari Taghavi Bayat jari.taghavi@ki.se Department of Dental Medicine, Division of Orthodontics, Karolinska Institutet, Huddinge SE-14104, Sweden

Supplemental data for this article can be accessed here.

© 2019 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group on behalf of Acta Odontologica Scandinavica Society.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (http://creativecommons.org/licenses/by-nc-nd/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

through a randomization process performed by a consulting company (Evry Sweden AB). After the recruitment process, described in detail elsewhere [12], a total number of 162 participants were recruited. However, due to incomplete or late incoming responses ($n = 7$ and 5, respectively) the final number of participants consist of 150 (56% girls). To reach a statistical power of 0.80 and a probability of Type I error (α) of 0.05, supposing a true correlation of 0.20 a sample size of at least 150 individuals was required [16]. Also, the point of stability of a correlation is arguably reached at a sample size of approximately 150 participants [17].

Methods

The measures in the present study were collected from a previous, more extensive study on reliability and validity of the Demand for Orthodontic Treatment Questionnaire (DOTQ) [18]. However, there is no overlap between the two studies in terms of predictions and statistical analyses. The measures used were the self-assessed scales of Global and Dental Self-Esteem [18]. The Dental Self-Esteem scale comprised eight items (three reverse coded) with higher scores indicating higher dental self-esteem and included items such as: 'I am proud of (the appearance of) my teeth'. The Global Self-Esteem comprised 10 items (four reverse coded) with higher scores indicating higher global self-esteem and included items such as: 'Sometimes I feel like I am not good enough' (reversed coded) [18]. The scales were in Swedish language and the items were originally constructed to fit subjects about 13 years of age [12]. Reliability figures and basic statistics are presented in the Result section.

The present study also included the Dental Health Component (DHC) of the Index of Orthodontic Treatment Need (IOTN) [19] retrieved from the general dental records of the participants. The DHC was used to represent the individuals professionally assessed treatment need. The collecting of the DHC grades through a dental record screening process has previously been described in detail [12].

Statistical analyses

For basic statistical analyses, the mean scores and standard deviations of the measures were calculated. Also, Cronbach's alpha coefficient was calculated based on the items of each scale. To examine the distinction between global and dental self-esteem factor analyses was conducted using *principal axis factoring* method with *direct oblimin* rotation allowing for possible factors to correlate. More importantly, analyses of variance (ANOVA) were conducted in order to test whether Global and Dental Self-Esteem varied differently across the DHC grades. Specifically, a 5 (DHC grades)$\times$2 (global vs. dental self-esteem) ANOVA was conducted with the DHC grades as the independent and self-esteem (repeated measure) as the dependent variables.

Ethical approval

Written information was distributed to all participants and their parents prior to commencement of the study and an informed consent form was signed. The research was approved by the Research Ethics Committee in Stockholm, Sweden (Registration No. 2009/5:4 and 2014/2084-32).

Results

Distinguishing between global and dental self-esteem

A major aim of the present study is to examine whether the two forms of self-esteem represent two distinct dimensions. Thus, dimensionality of the two self-esteem scales was examined by conducting exploratory factor analyses, using a principal axis factoring method with direct oblimin rotation allowing possible factors to correlate [20]. The results of these analyses revealed that there were four factors with eigenvalues above 1. An inspection of the factor loadings showed that for each scale the reversed and non-reversed items produced their own factor, except for one Global Self-Esteem item which loaded highly on both the reversed and non-reversed. To examine if this four factor solution was due to the reversed vs. non-reversed items, reversed items were removed and the factor analysis was conducted again. The result of this analysis revealed two distinct factors (one for each self-esteem scale) with eigenvalues above 1. Therefore, the analysis was repeated, now with all items of both scales, but restricting the analysis to two factors. This approach showed medium to high factor loading for all items within respective factor (factor loadings: .48 to .82 and .43 to .89 for the Global and Dental Self-Esteem, respectively). The factors were moderately correlated $r = .37$ and had high Cronbach's alpha reliability, that is .88 and .85 for the Global and Dental Self-Esteem scales, respectively.

Self-esteem across DHC grades

The DHC results were consequently matched against the findings from the analyses of the measures. The distribution of IOTN-DHC severity for the 150 participants is reported in Table 1.

To examine possible differential relation between the two forms of self-esteem and DHC, a 5 (DHC grades)$\times$2 (global vs. dental self-esteem) ANOVA was conducted with the DHC grades as the independent and self-esteem (repeated measure) as the dependent variables. Thus, the ANOVA comprised

Table 1. The dental and global self-esteem scores across DHC-grades.

		Dental self-esteem		Global self-esteem	
DHC-grade	*N*	*M*	*SD*	*M*	*SD*
1	74	3.29	0.90	3.67	0.67
2	17	3.39	0.89	3.74	0.73
3	17	2.71	0.80	3.65	0.85
4	32	2.63	0.94	3.73	0.80
5	10	3.03[a]	0.79	3.90	0.83

[a]Based on nine values due to incomplete response.

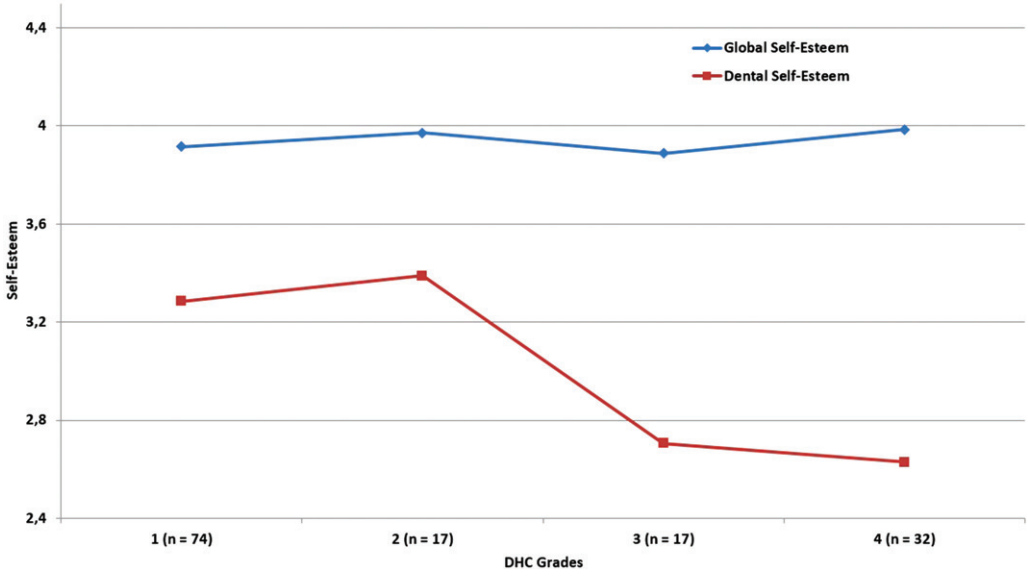


Figure 1. Global and Dental Self-Esteem as a function of DHC grades.

the DHC scores (1, 2, 3, 4 and 5) as the independent variable and two self-esteem measures (Global and Dental) as the dependent variables. This analysis showed (i) a non-significant main effect of DHC [F (4, 144) = 1.92, $p = .11$] with the self-esteem scores (the two self-esteems combined), varying only slightly across the DHC scores. It also showed (ii) a significant main effect of self-esteem [F (1, 144) = 121.31, $p < .001$] indicating that the Global Self-Esteem scores were higher than the Dental Self-Esteem scores. Finally, the analyses revealed (iii) a significant interaction effect [F (1, 144) = 5.42, $p < .001$] indicating that the scores on Dental Self-Esteem varied across the DHC score while the Global Self-Esteem scores did not, at least not to the same extent.

However, there are too few cases of the highest scores of DHC in the sample (Table 1). Also, and more importantly, the assignment of the DHC grade 5 includes malocclusions that are not perceivable for the individual, although of importance for dental health (e.g. DHC 5i, corresponding to ectopically placed canines). Thus, the impact of conditions related to the DHC 5i category can in some instances be regarded as minor for the individual's self-esteem. Therefore, a similar ANOVA was conducted excluding DHC 5. The outcome of this analysis revealed a similar pattern of result. Specifically, there was (i) a non-significant main effect of DHC [F (3, 136) = 2.24, $p = .086$], (ii) a significant main effect of self-esteem [F (1, 136) = 106.42, $p < .001$] and (iii) a significant interaction effect [F (3, 136) = 6.10, $p = .001$]. As can be seen in Figure 1, while the distribution of Global Self-Esteem across the DHC grades is negligible the variation in Dental Self-Esteem is significant, especially for the difference between DHC 1 and 2 in comparison to 3 and 4.

Gender differences

Additional analyses were conducted to explore possible gender effects by introducing gender as a between-subject effect in the model above. The results displayed same pattern as above. Specifically, the analyses showed a marginally significant effect of DHC ($p = .07$), a significant effect of gender with boys scoring higher on overall self-esteem ($p = .02$), and no significant interaction between DHC and gender ($p = .98$). Further examination of the gender effect on overall self-esteem showed that boys and girls differed significantly on Dental Self-Esteem ($p < .001$), but only marginally on Global Self-Esteem ($p = .096$, two-tailed).

As shown in the previous analysis, there was a significant effect of self-esteem ($p < .001$) and a significant interaction between the two self-esteem variables as a function of DHC ($p < .001$). More importantly, there was no significant interaction between the two self-esteem variables as a function of gender ($p = .76$) and no three-way interaction between self-esteem, DHC and gender ($p = .47$).

Discussion

The main aim of this study was to explore a possible disparate relation between malocclusion, indicated by DHC, and the two forms of self-esteem, represented by the two measures Global and Dental Self-Esteem. Specifically, it was predicted that Dental Self-Esteem would vary across different levels of DHC and that Global Self-Esteem would do so to a minor extent. The results supported the predictions, regardless of whether five- or four-grades of DHC were included. Relating to previous literature on gender differences in self-esteem and treatment demand [15,21–23], it was also analysed whether gender had any effect on our findings. In this regard, we found that the variation of Global and Dental Self-Esteem across the DHC scores was similar for boys and girls, in this sample. Thus, the finding did not provide evidence for gender to play any role for the distinction between Global and Dental Self-Esteem across DHC scores.

However, a significant gender difference was found for overall self-esteem scores, where boys scored significantly higher than girls. To further illuminate this, the relation between gender and Global and Dental Self-Esteem was analysed, revealing boys scoring higher on both.

These findings have several implications for research and practice. For example, a distinction should be made between the two forms of self-esteem when dealing with malocclusions as classified by DHC. Specifically, the results suggest that the individual's global self-esteem is not predictive of treatment need, while this it is the case for dental self-esteem. Thus, Dental Self-Esteem shows the sensitivity required for such a specific measure. Noticeably, while the main focus was the variation across different DHC scores, the findings also support the construct validity of the Dental Self-Esteem measure. The two forms of self-esteem were moderately correlated showing that the Dental Self-Esteem measure is indeed related to the individual's self-esteem.

There are however some limitations, for example considering sample size. An optimal number of individuals for the factor analysis would have been 180 (10 multiplied by the number of items), instead of 150. This is also valid for the number of individuals within each DHC grade, where there were too few individuals in the highest grade.

Within dental medicine research in general, and orthodontic research in specific, there is an increasing interest in the role of self-esteem [24–26]. This study highlights, despite some limitations, the importance of distinguishing between global and dental self-esteem, hopefully guiding future research to further explore these differences and transform them into best practice.

Conclusions

Global and dental self-esteem, represented by the two validated measures used, are differently related to malocclusion as indicated by IOTN-DHC. Independent of gender, dental self-esteem seems to be related to malocclusion while global self-esteem is not. These findings have implications for research and practice where the predictive power of dental self-esteem needs to be considered.

Data availability statement

The measures in the present study were collected from a more extensive study on reliability and validity of the DOTQ, as stated in the Material and Methods. The English version of the Global and Dental Self-Esteem scale is, accordingly, presented in Suppplementary Appendix A. The original measures or underlaying materials can be obtained upon request.

Disclosure statement

The authors report no conflict of interest.

Funding

This research was supported by the County Council of Uppsala under Grant FTVLUL-316641 and 581001 and Public Dental Service in Uppsala County.

References

[1] Thilander B, Pena L, Infante C, et al. Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. Eur J Orthod. 2001;23:153–167.
[2] Järvinen S. Traumatic injuries to upper permanent incisors related to age and incisal overjet. A retrospective study. Acta Odontol Scand. 1979;37:335–338.
[3] Burden DJ. An investigation of the association between overjet size, lip coverage, and traumatic injury to maxillary incisors. Eur J Orthod. 1995;17:513–517.
[4] Ericson S, Kurol J. Resorption of maxillary lateral incisors caused by ectopic eruption of the canines. A clinical and radiographic analysis of predisposing factors. Am J Orthod Dentofacial Orthop. 1988;94:503–513.
[5] Mohlin B, Axelsson S, Paulin G, et al. TMD in relation to malocclusion and orthodontic treatment. Angle Orthod. 2007;77:542–548.
[6] Helm S, Kreiborg S, Solow B. Psychosocial implications of malocclusion: a 15-year follow-up study in 30-year-old Danes. Am J Orthod. 1985;87:110–118.
[7] Shaw WC, Richmond S, Kenealy PM, et al. A 20-year cohort study of health gain from orthodontic treatment: psychological outcome. Am J Orthod Dentofacial Orthop. 2007;132:146–157.
[8] Liu Z, McGrath C, Hagg U. The impact of malocclusion/orthodontic treatment need on the quality of life. A systematic review. Angle Orthod. 2009;79:585–591.
[9] Taghavi Bayat J, Hallberg U, Lindblad F, et al. Daily life impact of malocclusion in Swedish adolescents: a grounded theory study. Acta Odontol Scand. 2013;71:792–798.
[10] Benson PE, Javidi H, DiBiase AT. What is the value of orthodontic treatment? Br Dent J. 2015;218:185–190.
[11] Dos Santos PR, Meneghim MC, Ambrosano GM, et al. Influence of quality of life, self-perception, and self-esteem on orthodontic treatment need. Am J Orthod Dentofacial Orthop. 2017;151:143–147.
[12] Taghavi Bayat J, Huggare J, Mohlin B, et al. Determinants of orthodontic treatment need and demand: a cross-sectional path analysis study. Eur J Orthodont. 2017;39:85–91.
[13] Tsichlaki A, O'Brien K. Do orthodontic research outcomes reflect patient values? A systematic review of randomized controlled trials involving children. Am J Orthod Dentofacial Orthop. 2014;146:279–285.
[14] Neiss MB, Sedikides C, Stevenson J. Self-esteem: a behavioral genetics' perspective. Eur J Pers. 2002;16:1–17.
[15] Murphy KR, Davidshofer CO, editors. Psychological testing, principles and applications. Upper Saddle River (NJ): Prentice Hall; 2001.
[16] Faul F, Erdfelder E, Lang AG, et al. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39:175–191.
[17] Schönbrodt FD, Perugini M. At what sample size do correlations stabilize? J Res Pers. 2013;47:609–612.
[18] Taghavi Bayat J, Huggare J, Mohlin B, et al. Predicting orthodontic treatment need: reliability and validity of the Demand for Orthodontic Treatment Questionnaire. Eur J Orthod. 2017;39:326–333.
[19] Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. Eur J Orthod. 1989;11:309–320.
[20] Fabrigar LR, Wegener DT, MacCallum RC, et al. Evaluating the use of exploratory factor analysis in psychological research. Psychol Methods. 1999;4:272–299.
[21] Shaw WC. Factors influencing the desire for orthodontic treatment. Eur J Orthod. 1981;3:151–162.
[22] Kerosuo H, Kerosuo E, Niemi M, et al. The need for treatment and satisfaction with dental appearance among young Finnish adults with and without a history of orthodontic treatment. J Orofac Orthop. 2000;61:330–340.

[23] Agou S, Locker D, Streiner DL, et al. Impact of self-esteem on the oral-health-related quality of life of children with malocclusion. Am J Orthod Dentofacial Orthop. 2008;134:484–489.

[24] Benson PE, Da'as T, Johal A, et al. Relationships between dental appearance, self-esteem, socio-economic status, and oral health-related quality of life in UK schoolchildren: a 3-year cohort study. Eur J Orthodont. 2015;37:481–490.

[25] Venete A, Trillo-Lumbreras E, Prado-Gascó VJ, et al. Relationship between the psychosocial impact of dental aesthetics and perfectionism and self-esteem. J Clin Exp Dent. 2017;9:e1453–e1458.

[26] Jaeken K, Cadenas de Llano-Pérula M, Lemiere J, et al. Reported changes in oral health-related quality of life in children and adolescents before, during, and after orthodontic treatment: a longitudinal study. *Eur J Orthod*. 2018. doi: 10.1093/ejo/cjy035.