INITIAL DEVELOPMENT OF AN ORAL HEALTH VALUES SCALE #3709

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Introduction

- Oral health values, the degree to which one demonstrates investment in improving or maintaining oral health, are considered a psychosocial determinant of oral health (see Fisher-Owens et al., 2007; McNeil & Randall, 2014; Patrick et al., 2006).
- Oral health values are indicated by overt behaviors (e.g., regularity of dental appointments) and verbal reports (e.g., stated interest in keeping one's natural teeth).
- In addition, oral health values are reflected by the level of importance one attaches to various elements of oral health and dental care (e.g., quality of dentition, brushing, flossing, cleanings)
- There is limited research on effects of unfavorable and/or negative beliefs about oral health on oral health status and behaviors.
- **This project aimed to develop an Oral Health Values Scale (OHVS) to be used in future research examining psychosocial barriers to dental treatment utilization.**

Methods

- **Participants:** 12 expert raters in the fields of dentistry, dental hygiene, clinical psychology, behavioral medicine, and public health provided feedback on an initial item pool for the OHVS developed by the Anxiety, Psychophysiology, and Pain research laboratory at West Virginia University.

- A developmental sample of participants from Amazon's Mechanical Turk (*N* = 301) was used to evaluate the remaining items.

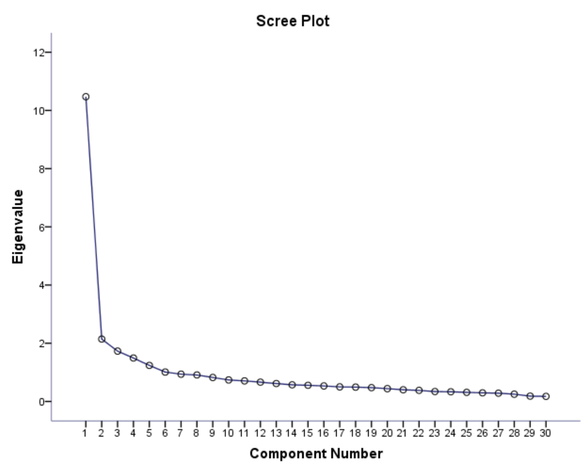
- **Measures:**
  - *Content Validity Scale* - Expert judges rated the 45 items of the initial Oral Health Values Scale on 5-point scales for representativeness of the construct and for item clarity.
  - *Oral Health Values Scale* (OHVS) - The 30-item OHVS is designed to measure the degree to which one demonstrates investment in improving or maintaining oral health.
  - *Dental Indifference Scale* (DIS; Nuttall, 1996) - The DIS is an 8-item multiple choice scale designed to measure apathy and lack of concern about dental health.
  - *Dental Free Time Trade-Off Scale* (DFT-O; Fyffe et al., 1999) - The DFT-O is a 5-item instrument which measures patient satisfaction with dental health and utility of dental health with a dental free time trade-off utility score.
  - *Dental Neglect Scale* (DNS; Thomson, Spencer, & Gaghwin, 1996) - The DNS is a 6-item Likert-type scale that measures oral hygiene behaviors and attitudes toward oral health.
  - *Importance of the Retention of Teeth Scale* (IRTS; Schuurs et al., 1984). Is a one-item designed survey to assess the importance attached to the retention of natural teeth.
  - *Oral Health Impact Profile* (OHIP-14; Slade, 1997) - The OHIP-14 is a 14-item self-report measure of oral health-related quality of life.
  - *Dental Fear Survey* (DFS; Kleinknecht, Klepac, & Alexander, 1973) - The DFS is a 20-item questionnaire used to measure fear responses to dental care experiences and stimuli.
  - *Health Literacy in Dentistry Scale* (HeLD-14; Jones et al., 2015) - The HeLD is a 14-item measure of oral health literacy.
  - *Revised Dental Beliefs Survey* (R-DBS; Milgrom, Weinstein, & Getz, 1995). The R-DBS is a 28-item self-report measure of attitudes and reactions to dental procedures and dental care that reflects distrustful attitudes toward dentists.
  - *Marlowe-Crowne Social Desirability Scale* (MCSDS; Reynolds, 1982) - A 13-item version of the MCSDS was used to measure the degree to which participants responded in a socially desirable way with true-false items.
  - *Demographic questionnaire* - The demographic questionnaire included questions about participants' age, sex, ethnicity/race, income, education, dental history, and other general information.

- **Procedure:**
  - Based on the content ratings, items with less than high representativeness (*M* < 4.0) were generally excluded. All items were revised as needed, yielding a 30 item scale.
  - The 30-item scale was administered to a developmental sample. Exploratory factor analysis was conducted and the relations between oral health values and other oral health-related constructs was examined.

Results

Content validity analyses
- The average rating for representativeness was 3.92 (*SD* = .73) and the mean rating for clarity across items was 3.77 (*SD* = .70).
- There was a strong, positive relation between representativeness and clarity ratings, *r* = .85, *p* < .01, indicating that more representative items were rated as having higher clarity.

Developmental sample analyses
- The internal structure of the OHVS was examined with an exploratory principal components analysis with promax rotation.
- The PCA revealed a 6-factor solution accounting for 60.23% of the variance in the items.



- *Figure 1*. Scree plot of PCA indicating a 6-factor solution.
- However, some items cross-loaded onto multiple factors and had low item-scale correlations, suggesting that a 4-factor solution was more appropriate.
- Subsequent PCA revealed a 4-factor solution accounting for 52.79% of the variance in the 30 items.
- The first factor reflected values related to *dental treatment attendance* and accounted for 34.91% of the variance.
- The second factor was made up of items related to the importance of flossing and accounted for 7.21% of the total variance.
- The third factor represented values related to *appearance* and accounted for 5.77% of the total variance.
- Finally, the last factor reflected values related to *retention of natural teeth* and accounted for 4.97% of the variance.
- The scale was revised to include 12 items to reduce the overall number of items and so that each factor would have an equal number (3) of items.
- Internal consistency for the 30-item (α = .93) and 12-item (α = .85) versions of the scale was high.
- Characteristics of the OHVS and other measures are included in Table 1.
- Table 1. *Mean, standard deviation, and internal consistency of total scores of study measures.*

Measure	Mean	Standard Deviation	Cronbach's Alpha
OHVS-30	114.59	18.17	.93
OHVS-12	44.09	8.08	.85
DIS	2.95	2.00	.67
DFT-O	.90	.16	N/A
DNS	22.06	5.12	.80
IRTS	2.37	1.57	N/A
OHIP	24.62	10.11	.94
DFS	49.38	21.15	.97
HeLD	59.31	9.25	.90
R-DBS	58.45	25.70	.97
MCSDS	5.63	3.51	.82

- Relations among the OHVS and other measures were examined with partial correlations, controlling for social desirability (see Table 2).

- Table 2. *Partial correlations among OHVS and measures of convergent validity, controlling for social desirability bias.*

Variable	1	2	3	4	5	6	7	8	9
1. OHVS-30									
2. OHVS-12	.96***								
3. DIS	-.67***	-.67***							
4. DFT-O	-.02	.01	.04						
5. DNS	.72***	.71***	-.62***	.09					
6. IRTS	-.15**	-.14**	.16**	-.01	-.15**				
7. OHIP	-.31***	-.32***	.33***	-.19**	-.46***	.11			
8. DFS	-.20***	-.21***	.28***	-.20**	-.40***	.09	.54***		
9. HeLD	.39***	.38***	-.37***	.09	.44***	-.17**	-.45***	-.31***	
10. R-DBS	-.28***	-.27***	.34***	-.17**	-.45***	.12*	.58***	.65***	-.51***

- *Note*: * *p* < .05, ** *p* < .01, *** *p* < .001
- Greater endorsement of oral health values was positively associated with positive attitudes toward oral hygiene care and greater oral health literacy.
- Oral health values were negatively related to apathy toward dental care, devaluation of natural teeth, lower oral health-related quality of life, dental fear, and distrust of dentists.
- After examining these correlations, oral health values, distrust of dentists, dental fear, and oral health literacy were entered into a linear regression model.
- The model indicated that a significant amount of variance in frequency of flossing over the past week was predicted, $F(4, 296) = 29.43$, $p < .001$, $R^2 = .29$. Together these factors accounted for 29% of the variance in flossing frequency.
- Based on statistically significant t-tests for the standardized beta weights of the predictor variables, oral health values (β = .18, *p* < .001) was the only variable to uniquely account for variance in flossing frequency.
- Regression analyses also indicated that the OHVS-12 statistically predicted the length of time since last dental visit, $F(1, 299) = 75.79$, $p < .001$, $R^2 = .20$.
- Oral health values accounted for 20% of the variation in time since last dental visit with a hygienist or dentist.
- Those with greater oral health values were more likely to have less time between regular dental visits (i.e., 6 months or less since last visit).

Discussion

- **A representative, multidimensional, 12-item Oral Health Values Scale was developed that predicts oral health behaviors and dental treatment utilization.**
- Our results suggest that the OHVS is a reliable and valid measure of oral health values.
- Our findings show that the OHVS is related to other oral health constructs in theoretically consistent ways (e.g., participants who had higher oral health values also had higher oral health literacy).
- The OHVS may be particularly useful in research settings for predicting oral health outcomes; the OHVS may also be helpful in understanding patients' level of motivation for personal and professional oral health care.
- The measure was developed using best practices from classical test theory that are not consistently employed in health research (e.g., assessing content validity before testing items with a developmental sample, using an oblique rotation in the factor analysis of a multifactorial scale with factors that are related).
- However, the study design could be improved by examining the discriminant validity of the OHVS with measures of unrelated constructs.
- Interestingly, the OHVS and other study measures were generally not significantly related to the utility score on the DFT-O. The DFT-O may have been a difficult measure to fill out in an online questionnaire format on MTurk.
- In addition, the findings indicate that other recently developed oral health measures, such as the HeLD, are internally consistent and have convergent validity.
- The relation between oral health values and other predictors of oral health behavior, such as oral health locus of control and dental fear, should be further examined to determine if oral health values uniquely accounts for variance in oral health behaviors not examined here (e.g., brushing, mouthwash use).
- Key next steps include administering the final scale to a large sample to validate the scale's psychometric properties and examine the relations among oral health values and related constructs, such as oral health-related quality of life, oral health literacy, and dental fear.
- It may also be useful to consider assessing the long-term stability of oral health values by evaluating test-retest reliability.

Conclusions

- Overall, the Oral Health Values Scale has evidence of acceptable content validity.
- The final 12-item scale has a four factor structure with high internal consistency.
- The OHVS-12 has evidence of convergent validity.
- The OHVS-12 statistically predicts oral health behaviors and dental treatment utilization (e.g., flossing frequency, length of time since last dental treatment).
- Oral health values is an important construct that may explain some variance in oral health and dental treatment seeking behaviors even when accounting for other factors that may affect utilization (e.g., distrust of dentists, dental fear).

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Support for this project was provided by the Department of Psychology, West Virginia University

Anxiety, Psychophysiology, and Pain Research Laboratory
Department of Psychology
Eberly College of Arts and Sciences
West Virginia University