# Adapting a Dental Anxiety Measure to Consider Previous Dental Trauma to Provide Higher Quality Care

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## Introduction

**How Dental Trauma is defined by this subject population:**
"The doctor was unfriendly and constantly joking about me and my teeth."
"…Being too harsh on my teeth."
"Unfriendly doctor telling me all my teeth are bad."
"She made my teeth sensitive for the past 2 years and she was making rude jokes during the appointment. I have not seen a dentist since."
"…I had quite a few small cavities and my dentist here in the US was quite judgmental about it…I dislike going to the dentist now."

This research study focuses on providing dentists with a reliable and valid empathy-based measure to help reduce patients' dental anxiety. This was accomplished by adapting the Modified Dental Anxiety Scale (MDAS) to develop the International-MDAS (I-MDAS). By utilizing the I-MDAS, dentists will be able to understand the root of their patient's anxiety levels to provide more personalized treatment corresponding to the patient's background.

**In surveying a national and international population, it was hypothesized that findings will show that the international population has higher MDAS scores.**

**It was also hypothesized that a higher International scale score will correlate to a higher MDAS score, indicating the criterion validity of the measure.**

## Methods

**Participants**
This study consisted of 465 participants. The control group comprised of the national population and the international population comprised the experimental group.
Responses were collected through Qualtrics from dental patients of a participating dental clinic, through online platforms including SurveySwap where the survey was posted both nationally and internationally, and by providing a scannable QR code that was randomly disturbed.

**Why the Modified Dental Anxiety Scale (MDAS)?**
The MDAS is a short 5 question Likert Scale survey that ranks responses from "not anxious" to "extremely anxious". Each "not anxious" response is worth one point. Each "extremely anxious" response is worth five points. The total score ranges between 5 to 25. Participants that score above 19 have extreme levels of dental anxiety and are more likely clinically dental-phobic. Importantly, the MDAS has very strong reliability and validity (Humphris et al., 2009).

**Developing the I-MDAS:**
This study adds the International scale to the MDAS, which includes 5 new empathy-based questions about retrospective and internationally comparative dental experiences. Overall, it contains two scales that are scored: The International scale and the MDAS scale. Together, the 10 questions comprise the overall I-MDAS.

**Why develop an empathy-based measure?**
While dentists are not expected to be therapists, research has shown that discussing one's challenges helps improve their anxiety (Lambert et al.,1994). Thus, the I-MDAS asks empathy-based questions which dentists can utilize to listen, inquire, understand, and share the emotions of their patients to help reduce their dental anxiety.
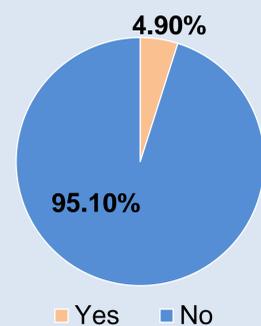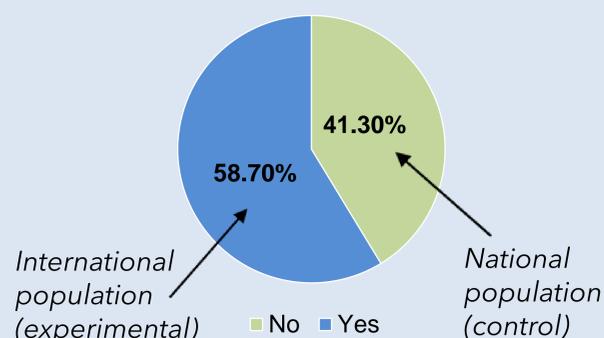
## Participant Profile

**N= 465**

### Age



60.40% — 18-24
25.60% — 25-34
5.60% — 35-44
5.20% — 45-54
2.60% — 55-64
0.40% — 65-74
0.20% — 75+
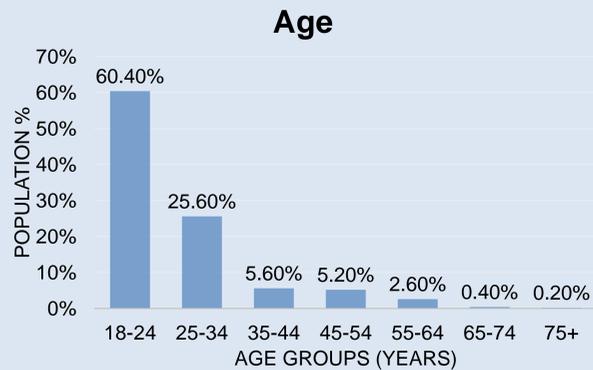
### Ethnicity

| | |
|---|---|
| White | 68.4% |
| Hispanic or Latinx | 6.0% |
| Black or African American | 2.4% |
| Native American or American Indian | 0.2% |
| Asian / Pacific Islander | 14.2% |
| Other (Please self-identify) | 8.8% |

### Have you ever received dental care?



4.90% Yes
95.10% No

### Have you ever received dental care in another country outside of the U.S.?



58.70% Yes
41.30% No

*International population (experimental)* — Yes
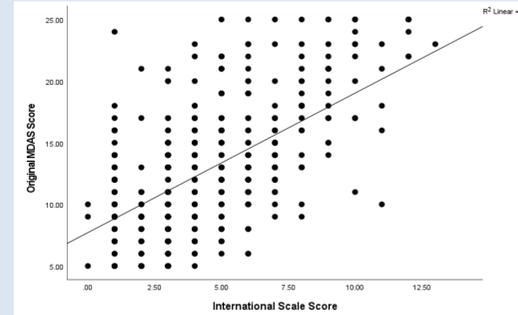*National population (control)* — No

## Discussion & Conclusion



**Figure 1:** A correlational analysis was used and produced a Pearson coefficient of $r(463)= .60$, $p<.001$. Thus, as Figure 1 depicts, the new items of the I-MDAS have a significant and positive correlation with the items of the original MDAS, supporting the second hypothesis. This correlation indicates the criterion validity of the I-MDAS.

The first hypothesis was rejected as the mean MDAS score for the national population ($M=12.73$, $SD= 5.13$) was not significantly different from the international population the ($M= 12.76$, $SD= 5.06$); $t(463)=-0.58$, $p=.95$.

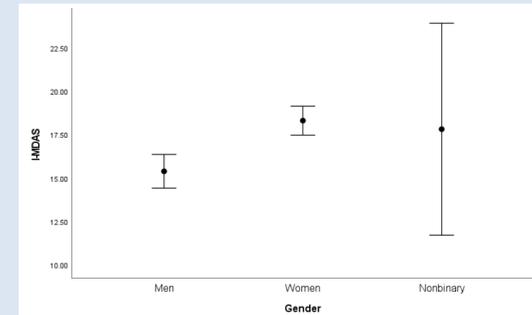**Figure 2**: It was found that there was a significant difference ($F= 9.65$, $p<.001$, $\eta2=.04$) between the I-MDAS scores among men ($M= 15.37$, $SD= 6.44$), women ($M=18.29$, $SD= 7.19$), and nonbinary ($M=17.8$, $SD=4.92$), with women producing significantly higher I-MDAS scores on average than men ($p<.001$.). These findings are illustrated in Figure 2. However, there was no significant difference in I-MDAS average scores between the nonbinary population in relation to men and women ($p= .99$).

**Table 1:** *Results of Item-total statistics for the I-MDAS (N=465)*

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| 1. Have you ever received any form of dental care? | 17.43 | 43.56 | .08 | .86 |
| 2. Have you had any perceived difficult or adverse experiences with previous dental treatments within the country? | 18.08 | 42.77 | .16 | .86 |
| 3. Have you ever had any perceived difficult or adverse experiences with previous dental treatments outside the country? | 17.95 | 42.25 | .22 | .86 |
| 4. How do you feel about attending a current dental visit based on your past negative experience? | 16.04 | 32.59 | .74 | .82 |
| 5. If you were told a story of someone else's difficult dental visit, how would you feel at a dental appointment? | 17.64 | 42.49 | .21 | .86 |
| 6. If you went to your Dentist for TREATMENT TOMORROW, how would you feel? | 15.91 | 30.32 | .83 | .81 |
| 7. If you were sitting in the WAITING ROOM (waiting for treatment), how would you feel? | 15.87 | 31.13 | .79 | .81 |
| 8. If you were about to have a TOOTH DRILLED, how would you feel? | 15.04 | 31.65 | .75 | .82 |
| 9. If you were about to have your TEETH SCALED AND POLISHED, how would you feel? | 16.03 | 32.21 | .70 | .82 |
| 10. If you were about to have a LOCAL ANAESTHETIC INJECTION in your gum, above an upper back tooth, how would you feel? | 15.23 | 32.57 | .66 | .83 |

The Cronbach's coefficient alpha for the I-MDAS in this study was .85 indicating that this new measure is reliable. The Cronbach's alpha coefficient for the MDAS scale alone in this study was .88. Table 1 presents the reliability analysis and item-total statistics. The deletion of any items has a negligible effect on the Cronbach's coefficient alpha.

**Conclusion:** The I-MDAS is a population-inclusive measure that shows evidence of reliability and validity for clinical applications. These findings encourage dentists across nations to implement the I-MDAS in their dental clinics around the world in order to give dentists a quick, accessible tool to further understand each of their patients. It is a guide for the dentist or dental hygienist to perform case-sensitive, empathetic, and individualized treatments to prevent further trauma and promote trust. Future research will include testing the I-MDAS's reliability and validity with other patient populations, as well as further testing for gender differences in I-MDAS scores. This will also allow for test-retest reliability analysis in reference to the future patient populations.

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