

Syracuse University

SURFACE

Syracuse University Honors Program Capstone Projects Syracuse University Honors Program Capstone Projects

Spring 5-2016

Psychological Reactivity to Dental Images and Sounds

Josue Deya

Follow this and additional works at: https://surface.syr.edu/honors_capstone



Part of the [Psychology Commons](#)

Recommended Citation

Deya, Josue, "Psychological Reactivity to Dental Images and Sounds" (2016). *Syracuse University Honors Program Capstone Projects*. 977.

https://surface.syr.edu/honors_capstone/977

This Honors Capstone Project is brought to you for free and open access by the Syracuse University Honors Program Capstone Projects at SURFACE. It has been accepted for inclusion in Syracuse University Honors Program Capstone Projects by an authorized administrator of SURFACE. For more information, please contact surface@syr.edu.

Psychological Reactivity to Negative Dental Images and Sounds

A Capstone Project Submitted in Partial Fulfillment of the
Requirements of the Renée Crown University Honors Program at
Syracuse University

Josué G. Deyá

Candidate for Bachelor of Science
and Renée Crown University Honors
May 2016

Honors Capstone Project in Psychology

Capstone Project Advisor: _____
Randall S. Jorgensen, PhD

Capstone Project Reader: _____
Laura VanderDrift, PhD

Honors Director: _____
Stephen Kuusisto, Director

Abstract

Individuals who fear the dentist or have dental phobia, actively avoid routine care and dental procedures, leading to deterioration of their oral health. Consequently, research into possible triggers of dental related anxiety is of interest. The purpose of the current study is to develop a standardized set of images and sounds to use in future cue reactivity studies for a specific population: namely, college students varying in their fear and anxiety based reactions to the dentist and dental procedures. Participants were given questionnaires assessing their personality, oral health behaviors, and dental anxiety. Participants were also asked to assess negative dental images and sounds using measures of valence and arousal.

No significant correlations were found between dental anxiety and participant's response to the negative images. However, significant correlations between sound arousal and dental anxiety were found. Significant correlations between Conscientiousness and participants' dental anxiety and fear were obtained. Further high dental anxiety and fear were correlated with the experience of not knowing what is going on, not having control, and lack of sympathy from dentists.

Executive Summary

Anxiety and fear caused by tools, attitudes, procedures, and atmosphere at the dentist office have been known to cause patients to avoid their providers. This Capstone project focuses on the relationship between personality, dental anxiety and fear, and their reactivity to images and sounds related to dentistry. Dental anxiety and fear, and personality questionnaires were expected to predict participants' ratings of images and sounds associated with dental work.

In order to assess dental anxiety and dental fear, the Index of Dental Anxiety and Fear (IDAF-4C⁺) was developed. The IDAF-4C index has been evaluated numerous times and has been deemed useful and valid to determine dental anxiety and fear (DAF) in adult populations.

Anxiety and other mental states are associated with personality type and reactivity to stimuli. To determine personality type, researchers have used the Big-Five personality scale. The Big Five scales assess the extraversion, agreeableness, conscientiousness, neuroticism, and openness of individuals.

Participants of the capstone were part of the PSY 205 (Foundations of Human Behavior) course. The participants signed up for the study to receive class credits for their participation. After signing up to one of our data collection time periods, the participants went to a classroom in Huntington Hall, where they were greeted by one of the research assistants. Participants were then given the consent form and, after agreeing to participate, they were given a questionnaire packet. The questionnaires in the packet included: The Big Five, the IDAF-4C⁺, and demographics. The Big Five personality scale was used to determine which type of personality each participant had. The IDAF-4C⁺ was given to assess if participants had dental anxiety or fear. The demographics was given to assess sex, ethnicity, race, age, country of origin, time since last dentist visit, and the reason for their last dentist visit. The purpose of assessing the

demographics is to determine if there are any differences between sex, race, ethnicity, or any other differences pertaining to the demographics that might affect the results of the study. Upon completion of the questionnaire packet, participants were given Self-Assessment Manikin booklets (SAM), which contain two scales assessing valence and arousal perceived by the participants after being exposed to each image and sound. Participants then attended to a projector screen, where they would observe or listen to images/sounds pertaining to dentistry. Participants rated the images and sounds on the SAM booklets by circling a number on both scales for every image and sound. By using personality, dental anxiety and fear, we attempted to develop a set of standardized images and sounds to use in further dental research.

This capstone can have an effect on the scientific community that focuses on dental research. The long-term objectives of this project are to utilize this set of images to investigate the psychological and physiological responses to dentistry. In order to investigate these responses, however, a set of images and sounds must be developed. This is an innovative study, and to our knowledge, no picture and sound set of this kind has ever been developed. The images and sounds selected will consist of dentist, dental equipment and dental procedures. The current study has long term aims to measure physiological responses to dentistry in relation to self-reported fear and anxiety.

Table of Contents

Abstract.....	2
Executive Summary.....	3
Acknowledgements.....	6
Advice to Future Honors Students.....	7
Introduction.....	8
Measures.....	10
The Big Five	10
IDAF=4C+	10
Self Assessment Manikin.....	11
Sample and Study Procedure.....	12
Participants.....	12
Procedure.....	12
Results.....	14
Demographics.....	14
Big Five scale.....	14
IDAF-4C+	14
Images and sounds.....	14
Analysis of Results.....	16
Tables.....	18
Discussion.....	20
Weaknesses.....	21
Conclusion.....	22
Works Cited.....	24
Appendices.....	26

Acknowledgements

I would like to thank Dr. Randall Jorgensen for accepting me as a part of his group of researchers and giving me the opportunity to conduct my own research with the help of his graduate student and research assistants. I would also like to thank Dr. Jorgensen's graduate student, Garry Spink Jr. Without Garry, I wouldn't have learned as much as I have about what goes on behind the scenes in psychological research. Garry was extremely supportive and played a vital role in the success of this capstone project. I would also like to thank my fellow research assistants who provided their time to help me with this study. Finally, I want to thank Dr. Laura VanderDrift for showing interest in my project and being my reader.

Advice to Future Honors Students

As a student who didn't get advice on what to expect from the Capstone experience, I would like to give some advice to future honors students who decide to join this journey full of ups and downs, but most importantly, knowledge. I was the honors student who was always afraid of the Capstone project and always avoided the topic until I really had to start thinking about it last year. I want you to learn from my mistakes.

I would suggest students to be proactive and start thinking about their capstone as soon as they can. I advise students to join a lab in freshman year, sophomore the latest, since this will give you a lot of lab experience, which you will need for your capstone. Joining a lab early will help you think about what possible topics you might want to investigate for your capstone.

Another advice: Follow the capstone timeline and don't be afraid to ask questions. The Capstone timeline serves a purpose, and it's there to prevent us students from having an excessive amount of work to do during the last two weeks of your Senior year. You will thank yourself if you follow the timeline provided to you. If you have any questions about your Capstone project, don't be afraid to use the resources and the staff provided to you by the Honors Department. People are always willing to help you as long as you ask.

Finally, don't leave everything for the end, you'll regret it. Start your capstone early and your Senior self will appreciate all your hard work done in previous months.

Introduction

Dental care is part of our healthy lifestyles. It is why avoiding the dentist is a problem that could lead to diseases ranging from toothaches to cardiovascular disease, and even the possibility of death (Mayo Clinic, 2016). Fear of the dentist and dental phobia is common in many places, including Australia, where some parts of the population can have a 35% prevalence of dental anxiety and fear (Armfield, 2006). Dental anxiety and dental fear have been known to cause individuals to avoid seeking dental care and avoid dental appointments (Klingberg, 1995; Milgrom & Weinstein, 1993).

Dental anxiety was first coined by Dr. Coriat, who defined the term as “an excessive dread of anything being done to the teeth’ with the result that ‘any dental surgery, no matter how minor, or even dental prophylaxis, may be so postponed or procrastinated that the inroads of disease may affect the entire dental apparatus.” (Coriat, 1946) Dental anxiety, dental fear, and dental phobia can be considered to be part of the same continuum, dental phobia being in the more extreme end of the spectrum (Corah, 1969).

Many tests have been developed to test dental anxiety, including the IDAF-4C⁺ (Armfield, 2010). These type of tests are a quick way to determine if patients have anxiety. Often, individuals who fear the dentist actively avoid routing care and dental procedures leading to deterioration of their oral health. Thus, accurate understanding of the impact of dental fear on oral and general health could help to stage interventions.

Personality has been associated with how participants rate negative and positive stimuli in valence scales (Canli et al., 2001). Personality has also been linked with behaviors regarding individuals’ health. Specifically, the aspects of the Big Five have been associated with with

physical health (Adams et al., 1998; Friedman, Hawley, & Tucker, 1994; Friedman et al., 1995). For example, the life led by individuals with high Conscientiousness is associated with better outcomes related to health. This is in part due to conscientious individuals being more responsible and disciplined with regards to their health. Conscientious individuals will seek out health care sooner than individuals with low conscientiousness when they observe something is wrong with them. On the other hand, low Agreeableness and high Neuroticism appeared to be health risk factors. This is in part because neurotic individuals might feel anxiety and fear towards healthcare providers; while individuals with low agreeableness is related with less obedience towards an authority (Lauren, 2002). Another example is the relation between personality and health behavior in college students. Facets of neuroticism including anxiety, hostility, and depression were related to alcohol consumption; facets of extraversion, including seeking of emotions and activity, were related to risky behavior related to alcohol; while facets of conscientiousness including low deliberation and auto discipline were related to risky behavior associated with alcohol consumption (Carpio, 2015). Variations in facets of each personality trait have an effect on personality.

The aim of this study was to examine whether elements of the Big Five covary with dental anxiety and fear, and affective responses of our dental images and sounds among college students in order to develop a standardized set of images and sounds for future studies. It is hypothesized that dental anxiety will be correlated with more negative reactivity towards the images and sounds. It is also hypothesized that personality will be correlated with reactivity to our stimuli: higher conscientiousness will be correlated with lower negative reactivity to the images and sounds while low agreeableness and neuroticism will be related to higher dental anxiety.

Measures

The Big Five scale. The Big Five are scales that assess openness, conscientiousness, extraversion, agreeableness, and neuroticism (John & Srivastava, 1999). Openness (O) is measured by such facets as curious, imaginative, artistic, and wide variety of interests. Conscientiousness measures various facets including: Competency, organization, dutifulness, achievement seeking, disciplined, and deliberate. Participants with high extraversion are self-confident, assertive, energetic, excitement-seeking, fervent, and outgoing, while participants with low extraversion present reticent, unconfident, low in energy, reserved, apathetic, and/or withdrawn. Agreeableness, which measures forgiveness, straightforwardness, altruism, lack of stubbornness, modesty, and sympathy. Neuroticism can be divided into various facets: anxious, irritable, shy, moody, and not self-confident. The Big Five scale will be used to assess the personality of participants within the sample of this study. The Big Five scale has been analyzed various times and has been found to both reliable and valid.

Index of dental anxiety and fear. The IDAF-4C⁺ was developed to quickly measure dental anxiety and fear in individuals by assessing various components regarding physiology, emotions, behaviors, phobia, cognition, and reaction to stimuli. The IDAF-4C⁺ is composed of three modules (Armfield, 2010). The first module, IDAF-4C (core fear), consists of 8 statements to which participants can disagree, agree a little, somewhat agree, moderately agree, or strongly agree with. The core fear module measures emotions, behaviors, physiology and cognition. The second module, IDAF-P (phobia), consists of four statements that participants respond to by marking “yes” or “no” on the index. The statements comprising the second module are based on the DSM-V diagnostic criteria for a non-clinical phobia diagnosis (American Psychiatric Association, 2013). The third module, IDAF-S (stimulus), contained 10 items asking participants

to what extent they were anxious about the stimuli they were exposed to when they went to the dentist, to which participants could respond on a 5-point unidimensional adjectival scale ranging from *not at all* (1) to *very much* (5). The items in the stimulus module were related to pain, embarrassment, lack of control, feeling sick, numbness, not knowing what the dentist is doing, cost of treatment, needles, gagging, and having an unkind dentist. The IDAF-4C⁺ will assess the level of dental anxiety and fear that participants have in the sample. The IDAF-4C⁺ has been

Self Assessment Manikin. The SAM is a self assessment test that measures arousal and valence perceived by stimuli presented to participants. Individuals in a study use the SAM to assess stimuli presented to them. There are two scales composing the test. The first scale measures the arousal, which is the physical response, experienced by the individual while being subjected to a stimulus (Kensinger, 2004). The second scale measures valence, the emotional response, sensed by an individual after being exposed to a stimulus. The valence measure is a 9-point scale, ranging from one (positive), 5 (neutral), and nine (negative). The arousal measure is also a 9-point scale, ranging from one (excited) to nine (calming). The SAM booklets given to participants in this study consisted of double sided pages, each page consisting of two sets of arousal and valence measures. Participants were to rate each image or sound on every set of scales.

Sample and Study Procedure

Participants: Twenty-nine college students (n=29) at Syracuse University were recruited to participate in the study. Fifteen participants (n=15) were male and fourteen (n=14) were females. Participants' ages ranged from 18 years of age (n=7) to 34 years of age (n=1) (mode=19). Participants were recruited from PSY 205 (Foundations of Human Behavior) subject pool. Participants were made aware of the opportunity to participate in our research in exchange for partial fulfillment of course requirements through the course's web-based experiment scheduling system, SONA.

Procedure: Upon arrival to the experiment site, participants were greeted and informed that the purpose of the study was to understand people's reactions to negative images and sounds associated with dentistry. They were then asked to carefully read the Informed Consent Form and, upon agreement to participate, provide their signature. Participants were reminded that they could withdraw from the experiment at any time and still receive full credit.

Participants were then asked to complete a packet encompassing a brief questionnaire containing demographic items such as age, sex, and ethnicity, location of birth, months since last dental appointment, and reason for last dental appointment. (Appendix A), the Index of Dental Fear and Anxiety Scale (Appendix B), and a Big Five personality inventory (Appendix C). Counterbalancing was done by randomly assigning the order of the questionnaires in the packets and handing them out randomly to participants in the study.

Following completion of the questionnaires, participants were then given Self-Assessment Manikin (SAM) booklets (Appendix D). Lights were then dimmed in the classroom, and participants were instructed to direct attention to the projector screen. The researcher

described the picture-viewing and sound-listening trial. Each trial included three components: 1) a preparation slide presented for 3s stating, “Please be ready for the next slide”; 2) a stimulus picture presented for 6s; and 3) a rating slide presented for 11s asking participants to rate how the picture made them feel while viewing it. Each subject rated 87 images and 6 sounds (Appendix E) using the SAM booklets. The images were found via google image search, while the sounds were recorded at a dentist’s office. The images and sounds represented stimuli frequently encountered in dentists’ offices. During each data collection session, the images and sounds were presented randomly. Each data collection session had a new power point presentation containing randomized images and sounds.

To conclude the experiment, participants were debriefed and thanked for their participation in the study. Participants then turned in all self-report measures. Referral to relevant treatment resources was offered to everyone.

Results

Demographics. Nineteen participants (65.5%) were from the United States. Seven participants (24.1%) were from China. The other three participants (10.3%) were from Bosnia, South Korea, and Nepal. Participant's ages ranged from 18 years to 34 years. There were fifteen (51.7%) participants who saw themselves as racially white. Ten (34.4%) of the participants declared themselves Asians. Three (10.3%) of participants were black. One (0.03%) participant declared that he was part of another racial group. Of the 29 participants, twenty-six (89.7%) answered that they belonged to 'Other' category of ethnicity, while three (10.3%) answered they were Hispanic or Latino. On average, participants' months since last dental appointment was 10 (SD=22). Most participants (n=22) (75.9%) stated the reason for their last appointment was due to a routine checkup.

Big Five Scale. The personality of 29 participants was measured. Extraversion traits presented with a mean of 25.6 (SD= 7.4). Agreeableness trait resulted in a mean of 32.7 (SD=5.6). Conscientiousness traits within participants presented at a mean of 30.6 (SD=5.24). Average neuroticism within participants presented in 23.2 (SD=7.0). The openness trait presented with a mean of 35.9 (SD=7.0).

IDAF-4C⁺. The results of the dental fear and anxiety module can be divided into the Core Fear module, the phobia module, and the stimulus module. The IDAF-4C had a mean of 1.8 with a standard deviation of 1.3. The IDAF-P module had a mean of 1.9, and a standard deviation of 0.3. The IDAF-S module presented with a mean of 2.7 and a standard deviation of 1.3.

Images and Sounds. For each of the images presented to the participants, valence and arousal were measured. The mean and standard deviation for valence are 6.06, and 1.74

respectively. For arousal, the mean and standard deviation, respectively, are 6.28 and 2.41. The participants performed the same task with the sounds. For the sound stimuli, the mean and standard deviation for valence are 6.84 and 1.65, and the arousal mean and standard deviation were 5.30 and 0.42.

Data Analysis

Participants. Of the 34 PSY 205 students who signed up to participate in our study, only 29 showed up to the data collection site and signed the consent form. One participant successfully completed the questionnaires portion of the study, but failed to properly complete the sound and image portion of the study. After collecting the data, the participant skipped the ratings of various images and sounds, while also leaving blank various pages of the SAM booklet. His questionnaire data was analyzed, but his image/sound SAM booklet data could not be analyzed. Only 28 participants had a full complement of image/sound SAM for analysis.

Correlations. To analyze the data, correlations, T tests and one-way ANOVA analyses were used through the SPSS program. Correlational analyses were performed to measure correlations between image valence, image arousal, sound valence, sound arousal, and dental anxiety. The correlational analyses showed a significant correlation between dental anxiety measures and sound arousal (sig.= .011, $r=-.475$, $p=0.05$). No other significant correlations were obtained.

Correlational analyses involving Big Five Measures revealed a significant correlation between conscientiousness and dental anxiety (Sig.=.029, $r= -.405$, $p=0.05$). Correlations between personality traits and image valence/arousal, and sound valence/arousal also were analyzed. The only significant correlations were between extraversion and image arousal (Sig.=.003, $r= -.529$, $p=0.01$), and extraversion and sound arousal (Sig.=.025, $r= -.422$, $p=0.05$)

Exploratory correlational analyses were performed in order to assess correlations between dental anxiety and items in the IDAF-P. There were significant correlations with 'Low speed drill sound' (sig.=-.004, $r=-.522$, $p=0.01$), 'Painful or uncomfortable procedures' (sig.=.003, $r=.531$, $p=0.01$), 'Not being in control with what is happening' (sig.=.014, $r=.452$, $p=0.05$),

‘Numbness caused by the anesthetic’ (sig.=.000, r=.705, p=0.01), ‘Not knowing what the dentist will do’ (sig.=000, r=.699, p=0.01), ‘Needles or injections’ (sig.=.001, r=.596, p=0.01), and ‘Having an unsympathetic or unkind dentist’ (sig.=.002, r=.544, p=0.01).

T tests. T Test analyses were performed to assess if there were any significant differences between genders, to assess if there were any significant differences in between ethnic groups, and to determine if there were significant difference between racial groups. Analyses revealed no no significant differences for the demographic variables on valence and arousal towards images and sounds. No gender effects were found, $t(27) < 1.65(27), p > .05$.

ANOVA. One-way ANOVA analyses were performed for image valence, image arousal, sound valence, sound arousal, and dental anxiety and race of participants. No racial differences were found, $F(2,24) < 1.52, p > .236$.

Tables

Table 1 – Correlations between dental anxiety, valence, and arousal

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>Dental</u> Anxiety (1)	1	.533 (-.121)	.077 (-.333)	.099 (-.318)	.011 (-.475)
Image Valence (2)	.533 (-.121)	1	.035 (-.393)	.001 (.583)	.009 (-.485)
Image Arousal (3)	.077 (-.333)	.035 (-.393)	1	.093 (-.324)	.000 (.803)
Sound Valence (4)	.099 (-.318)	.001 (.583)	.093 (-.324)	1	.000 (-.721)
Sound Arousal (5)	.011 (-.475)	.009 (-.485)	.000 (.803)	.000 (-.721)	1

P values in parentheses.

Table 2 – Correlations between Big Five traits and dental anxiety

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Extraversion (1)	1	.140 (-.281)	.008 (.483)	.295 (-.201)	.150 (.274)	.941 (-.014)
Agreeableness (2)	.140 (-.281)	1	.340 (.184)	.065 (-.347)	.176 (-.259)	.671 (-.082)
Conscientiousness(3)	.008 (.483)	.340 (.184)	1	.041 (-.381)	.962 (.009)	.029 (-.405)
Neuroticism (4)	.295 (-.201)	.065 (-.347)	.041 (-.381)	1	.481 (-.136)	.185 (.253)
Openness (5)	.150 (.274)	.176 (-.259)	.962 (.009)	.481 (-.136)	1	.667 (.083)
Dental Anxiety (6)	.941 (-.014)	.671 (-.082)	-.405 (.029)	.185 (.253)	.667 (.083)	1

P values in parentheses.

Table 3 – Correlations between IDAF-P and dental anxiety

	<u>1</u>
Dental Anxiety (1)	1
Painful or uncomfortable procedures	.004 (.532)
Feeling embarrassed or ashamed	.631 (.095)
Not being in control of what is happening	.017 (.447)
Feeling sick, queasy, or disgusted	.206 (.246)
Numbness caused by anesthetic	.000 (.704)
Not knowing what the dentist is going to do	.000 (.699)
The cost of dental treatment	.247 (.226)
Needles or injections	.001 (.593)
Gagging or choking	.162 (.272)
Having an unsympathetic or unkind dentist	.003 (.548)

P values in parentheses.

Discussion

The aim of the study was to develop a standardized set of images and sounds to be used in future research regarding dentistry and psychology. However, based on the results and the analyses, we determined that further research will have to be completed.

Dental anxiety was correlated with the arousal scale of all the sounds presented to participants. This correlation supports our hypothesis, and adds validity to the sounds used in the study. Since the sound arousal correlated with high dental anxiety and fear scores, there is a possibility of the sounds being part of a developed set of images and sounds that can be used for future research.

Another finding contrary to our hypothesis was that there were no significant correlations between (a) Dental anxiety and fear scales and (b) and the SAM scale scores of the images. These results don't support our hypothesis. This finding might be due to the images presented to participants. Most of the images presented were from a third person view or the dentists' view. The individuals don't usually see what is represented on the images because most of the time they have their eyes closed or are looking at the ceiling. However, correlational analysis showed some of the image scores trending toward significantly correlated values. If this study had more participants, there is a possibility of the images values being correlated with dental anxiety and fear.

If individuals are more anxious, they will be more aroused by dental stimuli. However, high conscientiousness in individuals helps decrease the anxiety towards dental stimuli. This could be because conscientious individuals manage a lifestyle that leads them to visit the dentist often. By often exposing themselves to the dentist's office, they can search for a dentist that gives them the most satisfying service.

Based on this study, there are various changes that dental care providers could do to decrease anxiety and improve patient satisfaction. Oral healthcare providers can start by being more sympathetic with their patients. Providers can also improve patient satisfaction by describing the procedures they will be performing. At the same time, providers can give patients more autonomy over the procedures by explaining that they can express their concerns and request the procedure be stopped if they feel any discomfort or pain. People with conscientiousness sees more doctors until he sees one that expresses these traits.

Weaknesses. There are weaknesses in this study that need to be considered. First, due to time constraints, the number of participants is 29, which does not significantly represent the college population. Second, the tests are likely to be of low power, as suggested by the number of correlations that were trending towards being significant.

Another weakness to be considered is the cross-sectional design of this study. Multiple administrations of the BFI across time that were then aggregated would have provided a more reliable estimate of the Big Five traits.

Lastly, another weakness of this study is that it is simply correlational and not causal. Based on the results of this study, a causal reason for the relationship between stimuli reaction and dental fear and anxiety cannot be derived.

Conclusion

A large population is afraid of attending their dentists' office for various reasons, mostly because they have anxiety or are afraid of their dentists. It has also been established that Dental fear and anxiety drive individuals into lifestyles that avoid their dental healthcare providers. Many tests have been created in order to determine if individuals have dental anxiety and fear. However, these tests don't focus on patient's personalities and how these could be affecting individuals' disposition to attend their appointments or to seek oral healthcare when there is a dental ailment.

The goal of our study was to develop a set of standardized images and sounds that would help determine dental fear and anxiety while taking into consideration personality. Based on the correlational analysis of our results, we could not develop the set of images and sounds. However, we had significant correlations that have implications in the field of dental healthcare. The lack of correlations between the stimuli and dental anxiety and personality could have been due to the weaknesses of our study. If the weaknesses of the study are fixed, better results may be attained concerning the stimuli.

Even though we did not obtain the results we were looking for, we did find unexpected correlations in our data with implications in the dental healthcare field. Based on the results, we proposed that dental care providers can improve in certain areas of their patient care to enhance patient satisfaction.

This study is like no other in that it tried to develop a set of images and sounds to use in further research in the dental field. This project opens the doors to psychologists who are interested in the field of dentistry, while at the same time helping the oral healthcare community by incorporating other disciplines into the field. Future research can focus on causation of dental

anxiety and fear, the role of anxiety and fear on individual disposition to seek dental assistance, or the use of dental anxiety and fear to help providers understand what they can improve to increase patient satisfaction and lower anxiety in their offices.

Works Cited

- Mayo Clinic (2016, April 30). Oral health: A window to your overall health. Retrieved May 19, 2016, from <http://www.mayoclinic.org/healthy-lifestyle/adult-health/in-depth/dental/art-20047475>
- Klingberg, G. (1995). Dental fear and behavior management problems in children: A study of measurement, prevalence, concomitant factors, and clinical effects. *Swedish Dental Journal Supplement*, *103*, 1–78.
- Milgrom, P., & Weinstein, P. (1993). Dental fears in general practice: New guidelines for assessment and treatment. *International Dental Journal*, *43*(Suppl. 1), 288–293.
- Coriat, I. H. (1946). Dental Anxiety: Fear of going to the dentist. *Psychoanal Rv.*, 365-367. Retrieved May 1, 2016, from <http://www.ncbi.nlm.nih.gov/pubmed/20993406>
- Corah, N. L. (1969). Development of a Dental Anxiety Scale. *Journal of Dental Research*, *48*(4), 596-596. doi:10.1177/00220345690480041801
- Armfield, J. M. (2010). Development and psychometric evaluation of the Index of Dental Anxiety and Fear (IDAF-4C⁺). *Psychological Assessment*, *22*(2), 279-287. doi:10.1037/a0018678
- Armfield, J., Spencer, A., & Stewart, J. (2006). Dental fear in Australia: Who's afraid of the dentist? *Australian Dental Journal Aust Dental J*, *51*(1), 78-85. doi:10.1111/j.1834-7819.2006.tb00405.x
- Canli, T., Zhao, Z., Desmond, J. E., Kang, E., Gross, J., & Gabrieli, J. D. (2001). An fMRI study of personality influences on brain reactivity to emotional stimuli. *Behavioral Neuroscience*, *115*(1), 33-42. doi:10.1037/0735-7044.115.1.33
- Adams, S. H., Cartwright, L. K., Ostrove, J. M., & Stewart, A. J., (1998). Psychological predictors of good health in three longitudinal samples of educated midlife women. *Health Psychology*, *17*, 412-420.
- Friedman, H. S., Hawley, P. H., & Tucker, J. S. (1994). Personality, health, and longevity. *Current Directions in Psychological Science*, *3*, 37-41.
- Friedman, H. S., Tucker, J. S., Schwartz, J. E., & Tomlinson-Keasey, C. (1995). Psychosocial and behavioral predictors of longevity: The aging and death of the “Termites.” *American Psychologist*, *50*, 69-78.

- Laursen, B., Pulkkinen, L., & Adams, R. (2002). The antecedents and correlates of agreeableness in adulthood. *Developmental Psychology, 38*(4), 591-603. doi:10.1037/0012-1649.38.4.591
- Mezquita, L., Stewart, S. H., & Ruipérez, M. Á. (2010). Big-five personality domains predict internal drinking motives in young adults. *Personality and Individual Differences, 49*(3), 240-245. doi:10.1016/j.paid.2010.03.043
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102–138). New York: Guilford Press.
- Kensinger, E. (2004). Remembering Emotional Experiences: The Contribution of Valence and Arousal. *Reviews in the Neurosciences, 15*(4), 1-5. doi:10.1515/revneuro.2004.15.4.241

Appendices

- A. Demographics**
- B. IDAF-4C⁺**
- C. The Big Five**
- D. Self-Assessment Manikin**
- E. Images**
- F. Sounds**

1. Demographics

EMAIL

2. IDAF-4C⁺

The Index of Dental Anxiety and Fear (IDAF-4C⁺) – Revised for DSM-5

The following questions relate to how you feel about going to the dentist.

1. How much do you agree with the following statements?	Disagree	Agree a little	Somewhat agree	Moderately agree	Strongly agree
(a) I feel anxious shortly before going to the dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(b) I generally avoid going to the dentist because I find the experience unpleasant or distressing.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(c) I get nervous or edgy about upcoming dental visits.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(d) I think that something really bad would happen to me if I were to visit a dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(e) I feel afraid or fearful when visiting the dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(f) My heart beats faster when I go to the dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(g) I delay making appointments to go to the dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(h) I often think about all the things that might go wrong prior to going to the dentist.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

2. Do the following statements apply to you?	Yes	No
(a) Going to the dentist is actively avoided or else endured with intense fear or anxiety.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
(b) My fear of going to the dentist has been present for at least 6 months.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
(c) My fear, anxiety or avoidance of going to the dentist significantly affects my life in some way (dental pain, avoiding eating some foods, embarrassed or self-conscious about appearance of teeth or mouth, etc.).	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
(d) I am afraid of going to the dentist because I am concerned I may have a panic attack (abrupt fear with sweating, pounding heart, fear of dying or losing control, chest pain etc.).	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
(e) I am afraid of going to the dentist because I am generally highly self-conscious or concerned about being watched or judged in social situations.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂

3. To what extent are you anxious about the following things when you go to the dentist?	Not at all	A little	Somewhat	Moderately	Very much
(a) Painful or uncomfortable procedures.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(b) Feeling embarrassed or ashamed.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(c) Not being in control of what is happening.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(d) Feeling sick, queasy or disgusted.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(e) Numbness caused by the anesthetic.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(f) Not knowing what the dentist is going to do.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(g) The cost of dental treatment.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(h) Needles or injections.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(i) Gagging or choking.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
(j) Having an unsympathetic or unkind dentist.....	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

3. The Big Five

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

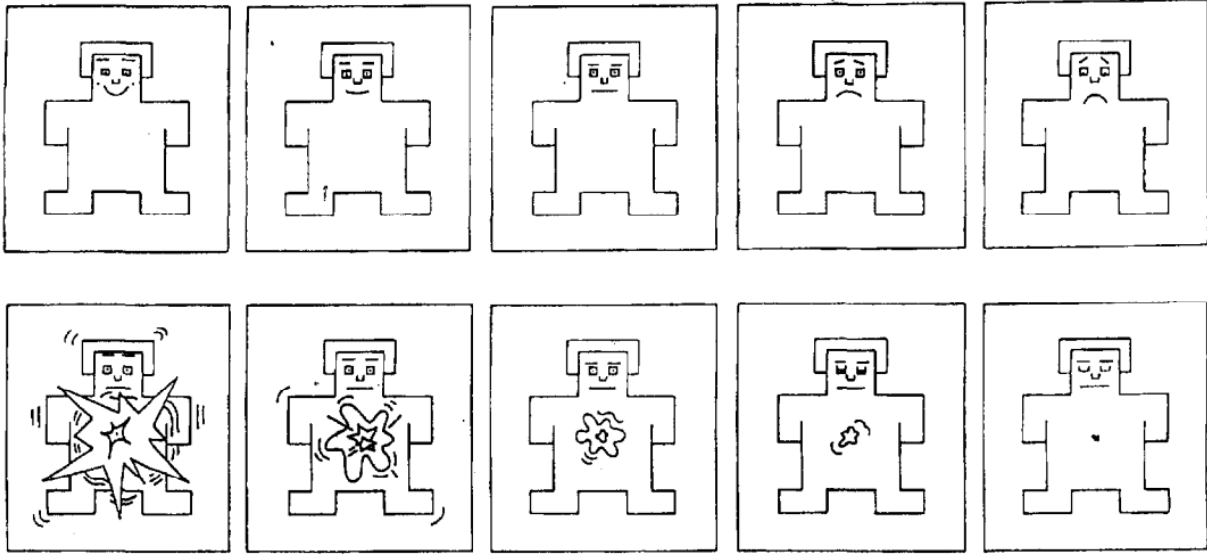
Disagree strongly 1	Disagree a little 2	Neither agree nor disagree 3	Agree a little 4	Agree strongly 5
---------------------------	---------------------------	------------------------------------	------------------------	------------------------

I see Myself as Someone Who...

- | | |
|---|--|
| ___1. Is talkative | ___23. Tends to be lazy |
| ___2. Tends to find fault with others | ___24. Is emotionally stable, not easily upset |
| ___3. Does a thorough job | ___25. Is inventive |
| ___4. Is depressed, blue | ___26. Has an assertive personality |
| ___5. Is original, comes up with new ideas | ___27. Can be cold and aloof |
| ___6. Is reserved | ___28. Perseveres until the task is finished |
| ___7. Is helpful and unselfish with others | ___29. Can be moody |
| ___8. Can be somewhat careless | ___30. Values artistic, aesthetic experiences |
| ___9. Is relaxed, handles stress well | ___31. Is sometimes shy, inhibited |
| ___10. Is curious about many different things | ___32. Is considerate and kind to almost everyone |
| ___11. Is full of energy | ___33. Does things efficiently |
| ___12. Starts quarrels with others | ___34. Remains calm in tense situations |
| ___13. Is a reliable worker | ___35. Prefers work that is routine |
| ___14. Can be tense | ___36. Is outgoing, sociable |
| ___15. Is ingenious, a deep thinker | ___37. Is sometimes rude to others |
| ___16. Generates a lot of enthusiasm | ___38. Makes plans and follows through with them |
| ___17. Has a forgiving nature | ___39. Gets nervous easily |
| ___18. Tends to be disorganized | ___40. Likes to reflect, play with ideas |
| ___19. Worries a lot | ___41. Has few artistic interests |
| ___20. Has an active imagination | ___42. Likes to cooperate with others |
| ___21. Tends to be quiet | ___43. Is easily distracted |
| ___22. Is generally trusting | ___44. Is sophisticated in art, music, or literature |

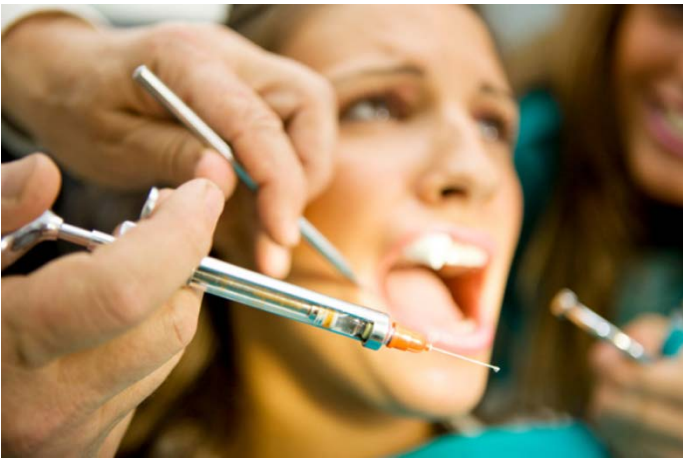
Please check: Did you write a number in front of each statement?

4. Self Assessment Manikin



On the top: Valence scale. On the bottom: Arousal scale.

5. Images



6. Sounds

- A. High suction
- B. High speed drill
- C. Suction
- D. X-ray machine
- E. Ultrasonic dental cleaner
- F. Low speed drill