



## **FEAR THE DENTIST: PSYCHOLOGICAL TREATMENTS OF DENTAL ANXIETY**

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### *Abstract*

*There is a considerable part of population which fears the dentist and proves to be anxious when speaking about dental treatment. Dental anxiety has a negative impact on people everyday life, being related with dental-avoidance behavior, negative memories and bad oral condition. All these elements affect directly, emotionally and financially, both patients and dentists. Most of the time dentists relay their treatments of anxious patients on pharmacological procedures which prove not to be so effective. Another possible strategy could be to use psychological treatments for managing dental anxious patients which prove to be quite unknown in dentistry, but could greatly improve their condition. Using Norman Corah`s Dental Anxiety scale in an online survey with 308 peoples, we measure the respondents` degree of dental anxiety and if is a good predictor of dental-avoidance behavior and reported level of pain when talking about dental interventions. The findings confirm that dental level of anxiety influence the amount of pain reported by the respondents, but there are no significant relations between this predictor and dental-avoidance behavior. Another aspect is the answers of the respondents regarding their projections about the ideal dentist and dental office, projections which could be part of a new dental anxiety-architecture.*

**Keywords:** dental anxiety; psychological treatments; behavioral architecture; Norman Corah`s Dental Anxiety Scale; pain

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## Introduction

The feeling of pain is often associated with dental treatment, proof being that more than 60% of dental patients report some degree of pain during their dental visits (Costa et al., 2012, p. 365). There are significant differences among patients in terms of the pain they report during identical dental procedures. Pain can be a learned response rather than a purely physical problem and in some cases, can be entirely mental (Hansen & Streltzer, 2005, p. 342). A number of factors including genetic makeup, age, gender and life experience contribute to a person experience of pain, but an important factor proved to be the individual psychological state, translated into his level of anxiety during the painful experience (Logia et al., 2008, pp. 651-652). Dental interventions invoke an emotional reaction that generates feelings of susceptibility, automatically activating a pattern of individual vulnerability and leading to slower cognitive assessment of the situation in which the person finds. The emotional reaction involved in the process generate nervousness, panic, sweating, all of this being characteristics of anxiety (Newton et al., 2012).

Dental anxiety has a high impact on life quality affecting our social activities such as meeting with friends, eating or going on holidays (Cohen et al., 2000). Irrational and negative thinking often characterize highly anxious dental patients, (Wijk & Hoogstraten, 2006, p. 479) and there is a positive relationship between anxiety and dental treatment avoidance (da Costa et al., 2012, p. 368). Redelmeier and Kahneman (2003) argue that 10% of the individuals who do not go to the dentist motivate their decision by the unpleasant experiences that they had so far. Both, dentists and patients, loose do to this situation. Patients loose financially and emotionally because they have a bad oral condition which implies a more intrusive, complex and painful dental intervention, fueling their anxiety in an ever-ending spiral (Armsfield et al., 2008). Dentists loose equally because an anxious patient stays about 20% longer in the chair<sup>1</sup> (Pawlicki, 1991, p. 123) and they experience an increased level of stress when working with anxious patients (Hill et al., 2008, p. 4). Moreover, dentists lose money because they need to use more anesthetics to

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<sup>1</sup> Since in most countries dental treatments are paid according to the procedure and not to the time spent by the patient in the chair, the 20% can represent when aggregating the data, a significant financial loss for the dentist.

calm down this category of patients. Further, anxious patients tend to cancel their appointments more often, than regular ones (Berggren & Carlsson, 1986).

Data suggest that there is a large group of persons presenting different levels of anxiety whose situation should be taken into account when dental treatment occurs. In a research on anxiety conducted on a sample of 649 persons from Netherland, 25% of the individuals said that they are afraid prior to each visit they make to the dentist, 33% experience fearing some occasions, 14% are anxious, 40% have an above-average level of anxiety and 22% presents a high level of anxiety (Stouthard & Hoogstraten, 1990).Cohen et al. (2000) reported that in UK, 1/3 from the adult population is anxious when speaking about dentist. The process of identifying a patient that is in risk, even for anxiety causes, is a prerequisite both for prevention and treatment in modern medicine. most of the time, dentists exclude the idea of considering as a possible treatment of anxiety the patient's ability to subjectively modify his emotional state, focusing instead exclusively on pharmacological treatments. Consistent with this attitude, there is a lot of research on pain and anxiety control based on pharmacological treatments which targeted peripheral and spinal cord mechanisms of opioid and anti-inflammatory analgesic therapy instead of psychological manipulation (Logia et al., 2008)<sup>2</sup>. Pawlicki (1991) argues there are three principal reasons for which dentists are generally using pharmacological methods to treat anxiety: a) lack of medical information about psychological techniques among dentists; b) a shared perception between dentists that psychological techniques are not effective; c) the tendency to recur most of the time to an interpretation of pain and anxiety as strictly related to the somatic component.

There are some evidences that psychological treatments of anxious patients could prove more effective than pharmacological ones. In an experiment on the comparative effects of anesthesia and psychological treatment on 99 dental patients from Sweden, Berggren and Carlsson (1986) arrived at the conclusion that the persons who were treated with psychological approaches presented, after the experiment, a lower level of anxiety during their first visit to the dentist. These findings are in accordance with the principles of

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<sup>2</sup>In this sense, local anesthetics are the most commonly used drugs in dentistry. A possible negative effect of this is that they can produce adverse effects such as allergic reactions, parenthesis, vasoconstrictors or malignant hyperthermia (Haas, 2002).

adaptation level theory who states that pain assessment depends on the context in which is induced, a perspective which is contrary to the neurophysiological model<sup>3</sup> (Dar et al., 1995, p. 189). Based on this perspective, dentists can create an environment which trigger the psychological capacity of their patients to reduce or inhibit anxiety. A first step is to understand how anxious people consider and imagine the ideal dental office and dentist, as examples of environmental structure who could inhibit their fears. Another important aspect is to test the prediction made by the dentist anxiety model which indicates that anxiety is a good predictor of the perception of pain regarding the dental treatment and dental-avoidance behavior. In this paper we analyze the responses of 308 individuals, collected from an online survey, answering three research questions: (I1) what is the respondents' degree of dental anxiety? (I2) are there differences between men and women in terms of the degree of anxiety? (I3) what are the expectations of the respondents, regarding the dental staff and office? and two hypothesis (H1) the degree of anxiety influence respondents' perception of pain when they refer to their last dental experience; (H2) the degree of anxiety influence respondents' time period that has passed since their last visit to the dentist.

In the first section of the paper we introduce the theoretical framework discussing about the subjectivity of emotions, degrees of anxiety and the relation between psychological treatments and management of the dental anxious patients. In the second section we present the methodology, procedure and the results of our research and in the last part we discuss the implications of our results on the psychological treatments of dental anxiety and the strategies which may be used by dentists when dealing with anxious patients.

#### *The Perception of Paine and the Relativity of Dental Anxiety*

Emotional states such as pain, fear or happiness are relative. Henry (1968) argues that pain is a subjective experience, being influenced by affective and evaluative components. Injuries resulting from physical exercises, games or those acquired during a fight, often pass unnoticed because strong emotions such as anger and fear block pain. It is generally believed that wounds are associated with pain and more serious a wound is, greater the pain felt. Reality

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<sup>3</sup>In this paper we use interchangeable the terms of *pharmacological* and *neurophysiological* treatment.

seems to contradict this assumption. There are reported differences in the perception of pain among soldiers whose severe injuries escaped them from a dangerous environment (where they repeatedly faced fatigue, discomfort, anxiety and fear of death) compared with civilians suffering less painful wounds (which determined them to leave the comfort zone of existence and entering into an unpleasant hospital medium) but reporting greater pain. Extreme experiences could represent reference-points, functioning as inputs which determine different levels of adaptation. For example, winning 1 million \$ represents such an input; this extreme event become the reference point in relation with which we judge all others events in our lives. In this regard small and unimportant events seems to be unpleasant compared with this gaining and tend to troubles us more than usual (Philip et al., 1978, p. 919)<sup>4</sup>. In our everyday life we are systematically dealing with illusions regarding the duration and intensity of events that affect us. Focusing illusion is an example of this type, occurring when a judgment about an entire object or category is made with attention focused on a subset of that category. A focusing illusion is likely to occur, whereby the attended subset is overweighed comparative to the unattended subset (Schkade & Kahneman, 1998, p. 340). Individuals evaluate results in terms of changes, not states and tend to overestimate the degree to which a tragic event affects them, at least in terms of time. Thus, if people judge what it is like to be a paraplegic by imagining what it is like to become a paraplegic, they will exaggerate the long-term impact of this tragic event on life satisfaction. This one of the general principles of adaptation level theory who consider that people`s judgments of current levels of stimulation depend upon whether this stimulation exceeds or falls short of the level of stimulation to which their previous history has accustomed them (Philip et al., 1978).

The limbic system, where emotions are processed, modulates the amount of pain experienced for a given noxious stimulus. Pain can be viewed as merely a signal that something is wrong somewhere in the body, until it reaches the emotional brain, where the signal becomes what we feel as pain. The perception of pain is highly dependent on the context in which it occurs

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<sup>4</sup>Some argues that the self-reported level of happiness of the inhabitants' poor cities is not lesser than that of the inhabitants' of rich cities (Liu, 1973). Cameron (1972) finds similar results regarding the relation between handicapped / physically healthy persons and happiness. We tend to view some categories of individuals unhappier than they see themselves.

and focusing one's attention on pain makes the pain worse (Helson, 1964; Rollman, 1979; Boureau et al., 1991; Hansen & Streltzer, 2005). For example, patients who suffered chronic pain for a long period develop greater resistance to pain compared with patients who suffered chronic pain for shorter period of time (Reuven et al., 1995). In this sense, the feeling of anxiety can be attributed to the experiences that an individual has. Past, present and future are interconnected, developing one from another. Present builds and rebuilds the past and future, while past and future build the present. Johnson and Steven (1990, p. 483) make a clear distinction between the idea of *construction* in terms of the process of creating the past and future from the present experience and *reconstruction* as the process of altering (distorting) our memory for an anticipation of what has been created. The past is constructed because each person's past is continually changing because *now* is amalgamated into the past. As the past expands, we change it. We cannot change a particular event, but we can change the entire context or background we refer to as *the past* and the framework within which a particular event is interpreted. Thus we may change the meaning or impact of a particular past event by constructing a new *past in the present*. Errors and distortions like preconceptions, confusion among sources of information, moods, attentional focus, and thoughts may be introduced in our evaluation of the past and anticipation of the future by a reconstructive process (Johnson & Steven, 1990). This reconstructive process can influence our perception about the past interactions with the dentist. There are cognitive and motivational factors constraining how people make predictions about the future, and these predictions determine how we will act when the future becomes the present. Our subjective likelihood estimate of the future may affect the behavior in report to dental treatment and how we will communicate our own dental experiences to other individuals.

The methods used by dentists to treat patients have a direct influence on how patients perceived the dental treatment. In two experiments which analyzed the phenomenon of duration neglect in people's global evaluations of past affective experiences, Frederikson and Kahneman (1993) argue that retrospective evaluations appear to be determined by a weighted average of snapshots of the actual affective experience, as if duration did not matter. This is a very similar idea with what Kundera says in one of his novel *'memory does not make films, it makes photographs'* (*Immortality*). Ariely (1998, 2000) presented through two experiments that the way we build experiential patterns

of actions determines how individuals make retrospectively global judgments about the whole experience. Apparently, the elements that matter in a retrospective evaluation of a medical act are the changing direction of pain intensity and pain intensity endpoint. Redelmeier and Kahneman (2003, p. 192) analyzing if the way colonoscopy process is ending affect the assessment of the event by patients and cause them to repeat the experience, concluded that the end-peak of intervention with a low point of pain intensity. These findings resulted in a 10% reduction of the negative evaluation of the overall procedure by the patients and an increase with 10% of the number of patients who presented to a further control<sup>5</sup>. Starting from these findings Frederickson (2000, p. 577) formulated the concept of *peak-and-end rule* meaning by it that people's global evaluations of past affective episodes can be predicted by the affect experienced during just two moments: the moments of peak intensity and the ending intensity of the procedure.

Anxiety, fear, and a sense of loss of control contribute to patient suffering. Treating anxiety and providing psychological support have been shown to alleviate pain and reduce analgesic use. Anxiety consists of patterns of autonomic arousal appearing with thoughts of fear and feelings of threat (Pawlicki, 1991, 120). There are different psychological treatments that dentist can rely on to manage anxious patients. Hansen and Streltzer (2005, pp. 340-342) enumerates some of them: (1) improving patients' sense of control and allowing them to participate in their care; (2) creating an environment that is nonthreatening; (3) preparing the needles and other equipment for the dental procedure out of patient sight; (4) using nonthreatening terms such as mild discomfort instead of pain; (5) distracting patients with conversation about subjects that interest them, such as their hobbies or family. Logia et al. (2008) considers that attention state, emotional context, empathy, hypnotic suggestions, attitudes and expectations (including the placebo response), can influence the perception on pain which is related to anxiety. There are some stimuli, like the odor of eugenol that is sufficient to produce automatic responses from patients such as fear, anger and disgust directly contributing to the exacerbation of anxiety and fear of dentist. On the other hand, there are

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<sup>5</sup>A raise of 10% could save a considerable amount of lives given that approximately 50% of the patients who make a colonoscopy returned for another control no more than 5 years, because of the painful experience increasing their chances to contract an unnoticed colon cancer.

other stimuli such as pleasant music, pleasant odors, pictures or humorous films which could be manipulated by the dentist in the context of his dental office who tend to reduce the degree of patients' anxiety. The feeling of hopelessness experienced by the patient when sitting on the dentist chair is another source of anxiety. Armfield et al. (2008) argues that 44.4% of the people who responded to a survey considered that they lacked control whenever they went to the dentist; 33.4% said they had no idea what was going to happen; 24.8% expected something bad to happen; 51% believed that they had no control over the environment; 49.8% said that the situation was beyond their control and 72.9% regarded the whole experience as dangerous. The study identified a significant correlation between lack of control, perceived degree and dental treatment and fear of the dentist. Pawlicki (1991, 122) consider there are some behavioral techniques on which dentist can relying to reduce the anxiety level of their patients: the first meeting with the patient could take place in a neutral environment (not the doctor's office); the parties could agree on a signal that would stop the procedure if the patient felt necessary, in order to provide a higher degree of control to the patient; the degree of anxiety of the patient could be assessed by the dentist. There could also be improvements in the design of the office such as the introduction of elements that would distract the patient from the procedure. Other strategies for coping with dental anxiety are suggested by Robin et al. (1998), Newton and Buck (2000), Bare and Lauren (2004), Lehrner et al. (2005), Walsh (2007), Leite et al. (2008), Herz (2009), Toet et al. (2010) and Newton and et al. (2012), referring to possible methods developed by dentist to control and reduce unpleasant factors such as odor, noises (the sound of drill) and sensations like vibrations who can affect anxious patients.

## **Method**

### *Participants*

Participants to the study came from an online survey<sup>6</sup> with  $n=308$  respondents, mean ( $M$ ) age=27.4 years,  $SD=9.6$ ,  $n=204$  females, conducted in Romania between April and October 2015.

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<sup>6</sup>Database accessible at <http://comportamentale.ro/our-research-databases/>



### *Instruments*

The survey was promoted on Facebook, online press and on the website of Center for Behavioral Studies, as part of an exploratory research about dental treatment in Romania. It contained 50 questions, assuming approximately 20 minutes for completion. To measure the respondent's degree of anxiety we used the Norman Corah's Dental Anxiety Scale, a Likert scale with 4 questions. The Corah's Dental Anxiety Scale has been used extensively in epidemiology and clinical research (Humphris et al., 1995). The level of anxiety was individually established calculating the total points for every answer. Each answer valued as follow: "a" - 1p; "b" - 2p; "c" - 3p; "d" - 4p; "e" - 5p; with a maximum of 20p. The four levels of anxiety were determined based on total points: from 9 to 12 points = "moderate anxiety with specific stressors that should be discussed and managed"; 13-14 points = "high anxiety"; 15-20 point = "severe anxiety (or phobia)"<sup>7</sup> (Corah's 1969, 1995; Nanda et al., 2013).

### *Procedure*

The scale was translated into Romanian and it has been discussed with dentists and pre-tested on a group of students in order to understand if the translation was accurate and clear. The feedback was included in the final construction of the survey questionnaire. To measure the respondents' perception of pain when referring to their last dental experience we constructed a question "How painful was the last dental experience that you had?" measured on an interval scale with 10 items (1=extremely painful, 10=not painful at all). Regarding the time elapsed since the last visit at dentist we rely on the next question "When was the last time you have visited the dentist (in number of months)?" To understand what are the respondents' expectations regarding the dentist and dental office we relied on two open questions "Please present three elements that an ideal dental office must have?" and "Please present the main three characteristics that you will expect from the ideal dentist?" The answers were interpreted and coded into general labels based on similarities. After this process we analyzed the frequencies with which these labels appeared. We conducted our analysis only on the answers of the respondents that presented a certain degree of anxiety, translated into a score more than 9 point on Corah's Dental Anxiety Scale.

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<sup>7</sup> The scale and its properties can be viewed at:  
[http://www.dentalfearcentral.org/media/dental\\_anxiety\\_scale.pdf](http://www.dentalfearcentral.org/media/dental_anxiety_scale.pdf) (Accessed on 28.09.2015)

## Results

Cronbach`s alpha for the Corah`s Dental Anxiety Scale has a score of  $\alpha=.869$  indicating a high degree of scale consistency. We obtained an anxiety level of the respondents to the survey of ( $M$ ) anxiety=9.4, ( $SD=3.8$ ). Therefore, 43.2% of our respondents aren`t anxious, 37.3% have a moderate level of anxiety, 9.4% a high level of anxiety and 10.1% a severe level of anxiety. These findings could be seen in the figure below (*see* Figure 1).

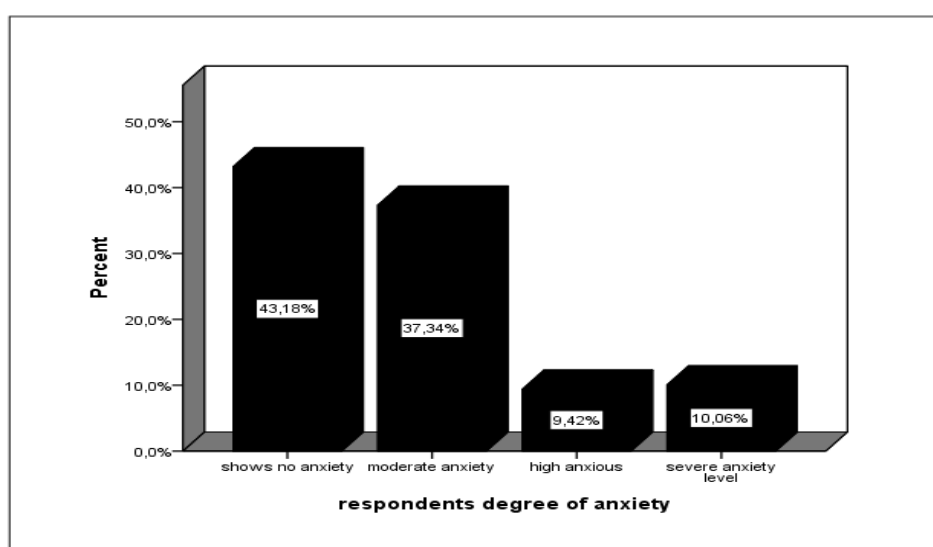


Figure 1. Respondents' degree of anxiety

On average, the degree of males 'anxiety ( $M$ )male=9.36,  $SE=0.26$  is not significantly different from the degree of females' anxiety ( $M$ ) female=9.26,  $SE=0.47$ ,  $U=6519$ ,  $z=-0.2$ , n.r.,  $r=-1.2$ . Regarding the differences between men and women according to the level of anxiety we have the following situation (*see* Table 1), with no statistically significant differences between the two types of respondents.

Table1. Differences between male and female in terms of the degree of anxiety

Degree of anxiety	General Percent	Male Percent	Female Percent	Mann-Whitney test
Shows no anxiety	43.2%	46,2%	43.1%	U = 1293, z = -0.18, n.r., r = -1.6
Moderate anxiety	37.3%	35.4%	38.2%	U = 858,5, z = -0.33, n.r., r = -3.2
High anxious	9.4%	9.2%	7.8%	U = 45, z = -0.26, n.r., r = -5,5
Severe anxiety	10.1%	9.2%	10.8%	U = 59,5, z = -0.38, n.r., r = -7.1

The respondents' perceived level of pain when talking about their last dental procedure, it is equal to  $M=6.7$ ,  $SD=3$ . Pain perception of the last visit to the dentist (controlled by variables such as age or gender) is significantly affected by the degree of anxiety  $H(3)=11.82$ ,  $p<.01$ . Jonck here's test revealed a significant trend in the data: as more degree of anxiety the median perception of pain increased,  $J=9688$ ,  $z=-3.199$ ,  $r=19.4$ . The degree in which anxiety influence respondents' time period that passed since their last visit to the dentist revealed a  $(M)$ mounts=26,4  $SD=10.7$ . However, the time period passed (controlling gender and age) is not significantly affected by the degree of respondents anxiety  $H(3)=10896$ ,  $n.r.$ ,  $r=-4.2$ .

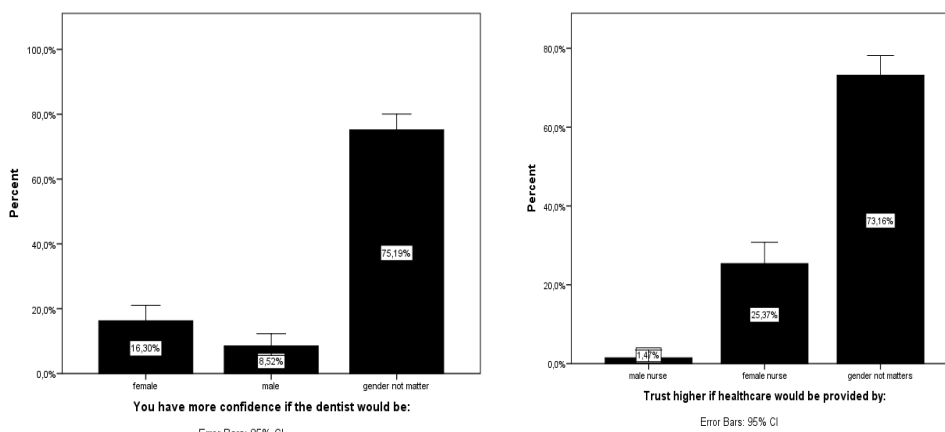


Figure 2. Trust for the dentist and assistant medical by gender

The respondents' expectations regarding the ideal dentist, dental office and the relation between them proved to be consistent with other findings, well-structured and recurrent. 75% of respondents stated that gender is not an

argument for trusting a dentist, and 73% of them believe that gender of dental-nurse does not matter. However, for the first question, there are 16% respondents which believe that if the dentist is a woman bring more confidence, while 25% respondents believe that a female nurses shows more confidence (see Figure 2).

The ideal age of the dentist is ( $M$ )=37.3,  $SD$ =5.2 and 88% of the respondents consider that a good dentist should have at most 40 years. When speaking about the probability to contracting a disease while at the dentist (expressed as percentage) data shows an ( $M$ )=32.8% probability expressed by the respondents. The profile of the ideal dentist has been outlined on the basis of 488 characteristics provided by the respondents. Among the most founded labels we mention those relating to: *professionalism* (30% - the dentist should be informed regarding the latest discoveries in the domain of dentistry or to characteristics such as dexterity); *a relaxed attitude* (30% - the dentist must prove a positive attitude, being calm, sociable, polite and engaging in discussions with the patient); *using explicit procedures* (22% - it is necessary to present the treatment and costs in a manner that is easy to comprehend); *behavior focused on the patient* (11%- monitoring the patient, careful to his needs and treating him as a human being) and *empathy* (8% - manifesting a friendly attitude). Beside these, there are other emphasized attributes (less than 5%) such as *hygiene* (the office should be clean, there should be aseptic instruments employed in procedures), *price* (in that it should be reasonable), *non-shaming and non-offensive attitude* (referring to the fact that the dentist should not mock the patient for his dental condition). Among the 448 items, those that describe the ideal office are the following: *equipment* (33% - the clinic should be technologically advanced), *pleasant environment* (television or magazines in the waiting room, flowers, paintings), *hygiene* (there should be a spittoon, patients should have access to the toilet, the office should be sterilized), *services provided to the patient* (there should be a water dispenser; the patient should have access to tea, coffee, toothbrush and toothpaste). There are also mentioned characteristics such as the *availability of information* (regarding prevention techniques or the prices of the procedures) and that dentists should be familiar with *behavioral strategies for reducing anxiety*.

## Conclusions

In this paper, we examine how dental anxiety influence perception of pain, dental-avoidance behavior and what are the ideal projections (how should it look, what should it contain, how dentist should present themselves) of 308 respondents to an online survey regarding dentists and dental offices. Using Norman Corah's Dental Anxiety Scale we found that 56.8% of our respondents presented a certain degree of dental anxiety and 10.1% of them an extreme degree, similar to a phobia. Even if our sample is not representative at national level, it is worrying that more than 50% of the respondents prove to be dental-anxious. These findings are consistent with the data presented by Southard and Hoogstraten (1990), Cohen et al. (2000) and Logia et al. (2008) who sustain there is a considerable category of people who suffer from dental anxiety. Moreover some authors sustain that dental-anxious prove to rely on dental-avoidance behaviors because they are afraid of dentist (Redelmeier & Kahneman, 2003), fact that has negative consequences (emotionally and financially) both upon them and dentists (Pawlicki, 1991; Cohen et al., 2000; Armsfield et al., 2008; Hill et al., 2008). Apparently our data support the hypothesis that people who are anxious tend to report higher levels of pain when speaking about their last dental intervention. Given that pain is a subjective feeling (Hansen & Streltzer, 2005) and is related to dental treatment (Costa et al., 2012) it could be an important factor that interposed between our intention of going to dentist and practically doing it. People who are afraid of dentist (Berggren & Carlsson, 1986) tend to have a bad oral condition because most of the time they go to dentist only in emergencies, avoiding preventive visits. However, a possible critic for this argument could be that dental-anxious patients reported higher level of pain because they need to endure complex and painful interventions due to their bad oral condition. To answer this, we asked our respondents to tell us for what type of dental intervention go to the dentist last time. Responses were organized in three categories according to level of pain that dental intervention entailed (low, moderate and high). To determine how painful are considered the types of dental interventions reported by our respondents we discuss them with a dentist. For example, treatments like cementing, scaling, fluoride, teeth whitening, treatment of gingival inflammation etc. were considered interventions which implies a low level of pain. On the other hand, interventions like toothache, implant insertion, treating

an infection or removal of a nerve were considered being very painful. For the two groups of respondents (anxious and non-anxious) we have the following  $(M)_{\text{non-anxious}}=1.14$ . For 57.4% of them the last dental intervention suffered involved a low level of pain; 27% a moderate level of pain, 0.9% a high level of pain and 14.8% did not present any level of pain. On the other hand, regarding the group composed by persons who present a certain anxiety degree  $(M)_{\text{anxious}}=1.25$ . 60.9% of them suffered a procedure with a low level of pain, 21.2% moderate level and 7.3% reported a high level of pain while 10.6% did not present any level of pain. Apparently the types of procedure that anxious and non-anxious respondents, according to level of pain are very similarly but further research should be done in this sense.

Data shows there is not a significant statistical relation between respondent's level of anxiety and number of months passed since their last visit to dentist. Maybe a better question to test this hypothesis would have been to ask our respondents how many times they went to the dentist in the past years and for what kind of treatments. Further, the theory of Walsh (2007) who considers there could be differences (based on respondent's gender<sup>8</sup>) regarding the level of anxiety reported by people is not sustained by our data. Another gender stereotype regarding the desire of people that the dentist should be a woman, due to her image of protector and motherhood (Bare & Lauren, 2007) could be an argument for only 16% of our respondents in case of preference for a woman dentist and 25% in case of preference for a woman nurse.

The attributes related to the ideal dentist expressed by our respondent's shows that most of them want to be professional, relaxed and centered on the patient, findings that are in the same line with those delivered by Hansen and Strelter (2008) and Armsfield et al. (2008). Regarding the ideal dental office, the most recurrent attributes prove to be the idea of a pleasant environment, modern equipment, good hygiene, arguments that could be found in Walsh (2007), Bare and Lauren (2004) or Logia et al. (2008). On the other hand, an explicit formulation of respondents of the idea that dentists need to master the psychological techniques to manage anxious patients is very low (below 0.5%) highlighting the lack of information regarding other strategies, except pharmacological methods, to deal with these kind of troubles. One way we could increase the level of information regarding the advantages of using

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<sup>8</sup>Because men tend to hide their weaknesses due to cultural constraints of masculinity.

psychological treatments when dealing with anxious patients is to introduce psychological anxiety management courses in the undergraduate curriculum during their academic training years (Hill et al., 2008). However, we need to be careful when using psychological treatments when dealing with an anxious patient because every person is a unique case. For example, a brief relaxation method and music-induced distraction reduce dental anxiety considerable in case of low level anxiety patients but prove to not be effective in case of high anxious patients (Logia et al., 2008, p. 653).

There are some serious limitations of this study and one of the biggest is the sample used in this research which is auto-selected in an only survey not being representative at national level. On the other hand, given that in our country there are not similar researches at the moment it is impossible to correlate these results with other studies of this kind. The type of questionnaire used (online-survey) raise a series of issues related to limited sample or the inability to monitor the respondent's process of answering the questions. In order to improve the quality of the conclusions in future research, we consider that the online survey must be more focused on the participants selection. Thus, there must be more attention paid to the socio-demographical structure of the respondents

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#### References

- Ariely, D. (1998). Combining Experiences Over Time: The Effects of Duration, Intensity Changes and On-Line Measurements on Retrospective Pain Evaluations. *Journal of Behavioral Decision Making*, 11, 19-45.
- Ariely, D., & Loewenstein, G. (2000). When Does Duration Matter in Judgement and Decision Making? *Journal of Experimental Psychology: General*, 129(4), 508-523.
- Armfield, J. M., Slade, G. D., & Spencer, J. A. (2008). Cognitive vulnerability and dental fear. *BMC Oral Health*, 8(2), 1-11.

- Bare, L. C., & Dundes, L. (2004). Strategies for Combating Dental Anxiety. *Journal of Dental Education*, 68(11), 1172-1177.
- Beecher, H. K. (1946). Pain in Men Wounded in Battle. *Annals of Surgery*, 123(1), 96-105.
- Berggren, U., & Carlsson, G. S. (1986). Qualitative and Quantitative Effects of Treatment for Dental Fear and Avoidance. *Anesthesia Progress*, 9-13.
- Boureau, F., Luu, M., & Doubrere, J. F. (1991). Study of experimental pain measures and nociceptive reflex in chronic pain patients and normal subjects. *Pain*, 44, 131-138.
- Brickman, Ph., Coates, D., & Janoff-Bulman, R. (1978). Lottery Winners and Accident Victims: Is Happiness Relative? *Journal of Personality and Social Psychology*, 36(8), 917-927.
- Cameron, P. (1972). Stereotypes about generational fun and happiness vs. self-apraised fun and happiness. *The Gerontologist*, 12(2), 120-123.
- Cohen, S. M., Fiske, J., & Newton, J. T. (2000). The impact of dental anxiety on daily living. *British Dental Journal*, 189, 385-390.
- Corah, N. L. (1969). Development of a Dental Anxiety Scale. *Journal of Dental Research*, 596.
- da Costa, M., Suzanne, R., do Nascimento Ribeiro, S., & Cabral, E. D. (2012). Determinants of painful experience during dental treatment. *Rev Dor. Sao Paolo*, 13(4), 365-370.
- Frederickson, B. L. (2000). Extracting meaning from past affective experiences: The importance of peaks, ends, and specific emotions. *Cognition and Emotion*, 14(4), 577-606.
- Frederickson, B. L., & Kahneman, D. (1993). Duration Neglect in Retrospective Evaluations of Affective Episodes. *Journal of Personality and Social Psychology*, 65(1), 45-55.
- Haas, D. A. (2002). An Update on Local Anesthetics in Dentistry. *Journal of the Canadian Dental Association*, 68(9), 546-551.
- Hansen, G. R., & Streltzer, J. (2005). The Psychology of Pain. *Emergency of Medicine Clinics of North America*, 23, 339-348.
- Helson, H. (1964). *Adaptation-Level Theory: An Experimental and Systematic Approach to Behaviour*. New York: Harper and Row.
- Herz, R. S. (2009). Aromatherapy facts and fictions: A scientific analysis of olfactory effects on mood, psychology and behaviour. *International Journal of Neuroscience*, 119, 263-290.



- Hill, K. B., Hainsworth, J. M., Burke, F. J. T., & Fairbrother, K. J. (2008). Evaluation of dentists' perceived needs regarding treatment of the anxious patient. *British Dental Journal*, 1-5.
- Humphris, G., Morrison, M. T., & Lindsay, S. J. (1995). The Modified Dental Anxiety Scale: validation and United Kingdom norms. *Community Dental Health*, 143-150.
- Johnson, M. K., & Sherman, S. J. (1990). Constructing and Reconstructing the Past and the Future in the Present. In E. T. Higgins, & R. M. Sorrentino (Eds.), *Handbook of Motivation and Cognition: Foundations of Social Behaviour* (pp. 482-526). New York: The Guilford Press.
- Lehrner, J., Marwinski, G., Lehr, S., Jöhren, P., & Deecke, L. (2005). Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. *Psychology of Behaviour*, 86, 92-95.
- Leite, M. P., Fassin, J. Jr., Baziloni, E. M. F., Almeida, R. N., Mattei, R., & Leite, J. R. (2008). Behavioral effects of essential oil of *Citrus aurantium* L. inhalation in rats. *Brazilian Journal of Pharmacognosy*, 18, 661-666.
- Liu, D. C. (1973). *The quality of life in the United States: 1970*. Kansas City: Midwest Research Institute.
- Loewenstein, G., & Prelec, D. (2007). Preferences for Sequences of Outcomes. In G. Loewenstein (Ed.), *Exotic Preference* (pp. 439-480). Oxford: Oxford University Press.
- Marco, L., Schweinhardt, P., Villemure, C., & Bushnell, C. M. (2008). Effects of Psychological State on Pain Perception in the Dental Environment. *JCDA*, 74(7), 651-656.
- Nanda, J., Sharma, D., Vashista, K., & Sandhu, M. (2013). Assessment of Dental Anxiety in Children and Their Caregivers Using Norman Corah's Dental Anxiety Scale. *Journal of Dental Specialities*, 21-26.
- Newton, T. J., & Buck, D. J. (2000). Anxiety and Pain Measures in Dentistry. *J Am Dent Assoc*, 131, 1449-1457.
- Newton, T., Asimakopoulou, K., Daly, B., Scambler, S., & Scott, S. (2013). The management of dental anxiety: time for a sense of proportion. *British Dental Journal*, 6, 271-274.
- Pawlicki, R. E. (1991). Psychological/Behavioral Techniques in Managing Pain and Anxiety in the Dental Patient. *Anesth Prog*, 38, 120-127.

- Redelmeier, D. A., & Kahnema, D. (1996). Patients` memories of painful medical tratments: real-time and retrospective evaluations of two minimally invasive procedure. *Pain*, 66, 3-8.
- Redelmeier, D. A., Katz, J., & Kahneman, D. (2003). Memories of colonoscopy: a randomized trial. *Pain*, 104, 187-194.
- Reuven, D., Ariely, D., & Frenk, H. (1995). The effect of past-injry on pain threshold and tolerance. *Pain*, 60, 189-193.
- Robin, O., Alaoui-Ismaili, O., Dittmar, A., & Vernet-Maury, E. (1998). Emotional Responses Evoked by Dental Odors: An Evaluation from Autonomic Parameters. *Journal of Dental Research*, 77(8), 1638-1646.
- Rollman, G. B. (1979). Signal detection theory pain measures: empirical validation and adaptation-level effects. *Pain*, 6, 9-21.
- Schkade, A. D., & Kahneman, D. (1998). Does Living in California Make People Happy? A Focusing Illusion in Judgements of Life Satisfaction. *Psychological Science*, 9(5), 340-346.
- Stouthard, M. E. A., & Hoogstraten, J. (1990). Prevalence of dental anxiety in the Netherlands. *Community Dent Oral Epidemiol*, 18, 139-142.
- Toet, A., & Smeets, M. A. (2010). Effects of Pleasant Ambient Fragrances on Dental Fear: Comparing Apples and Oranges. *This article is published with open access at Springerlink.com*.
- Walsh, L. J. (2007). Anxiety prevention: implementing the 4 S principle in conservative dentistry. *special / NEEDS* 24-26.
- Wijk, A. J., & Hoogstraten, J. (2006). Dutch translation of the Fear of Pain Questionnaire: Factor structure, reliability and validity. *European Journal of Pain*, 10, 479-486.

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