

**The Relationship between Dental Avoidance, Dental Anxiety, and Dental Checkups in
Students**

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Abstract

Dental avoidance, conceptualized as patients avoiding dental visits, was found to be a large problem in the western society, especially in young adults between the ages of 18 and 29. It can among other things be explained by dental anxiety and both, dental avoidance and dental anxiety can be linked to poor oral health. The importance of regular dental checkups has long been known, yet neither dental avoidance nor dental anxiety related to dental checkups have been the focus of attention in research. The focus of this research lies on students at the University of Twente between the age of 18 and 29. Further, this research aims at i) exploring barriers students face toward regular dental checkups and ii) finding strategies to reduce or overcome the identified barriers, iii) especially the barrier dental anxiety. To meet these goals, a questionnaire including the Dental Anxiety Scale, a tool for determining patients anxiety scores, and four open questions about dental avoidance and dental anxiety has been designed. The questionnaire was published, and the obtained data was analyzed by designing a coding scheme, following a qualitative and inductive approach. Further, the frequencies of each code were determined and viewed related to the participants anxiety scores. Through the designed coding scheme, 18 codes representing the collected barriers and strategies for barrier reduction were acquired. The identified barriers toward regular dental checkups were unfriendly dental staff, dental anxiety, the fear of pain, the perception that regular checkups are not necessary, laziness, high cost of dental checkups, long distances to the dental office, poor availability of appointments, having to call to make an appointment, forgetting that it is time for a checkup, a lack of time, poor time management, not having gotten in the routine of regularly attending dental checkups, other illnesses and health issues, and the covid pandemic. The most important strategies for barrier reduction were friendlier dental staff and a better dentist-patient-relationship, more information on the consequences of infrequent dental checkups, increasing perceived importance, cheaper dental checkups, closer proximity to the dental office and shorter waiting times, the option to book appointments online, the dental office sending reminders, and social support. To reduce dental anxiety in relation to dental checkups, the most important strategies were friendlier dental staff and a better dentist-patient-relationship, more information on what to expect during the checkup, cheaper cost, specific requests regarding the interior design of dental offices, taking someone with them to the checkup, having fewer dental concerns, being in control of taking breaks and deciding which procedures are being executed and when, and lastly applying techniques like positive affirmations. Several suggestions for practical implications could be made,

considering the most important codes for barrier reduction. Lastly, limitations of this research were acknowledged and recommendations for future research has been made.

Introduction

Dental avoidance, which describes the absence of patients from the dental office for an unusually long time (Beaton et al., 2014), is a widely overlooked problem. A study found that 21% of the Dutch population did not visit the dentist in 2021 (Centraal Bureau voor de Statistiek, n.d.). However, even more worrying is that, although dentists recommend getting a dental checkup twice a year (Bundesärztekammer, n.d.), it is likely that the percentage of people not going for a single dental checkup in 2021 is even higher than 21%. Thus, the study mentioned above did not differentiate whether people went to the dentist for a checkup or because they needed treatment. Young adults seem to be among the most affected by dental avoidance, as the same study showed that almost 20% of Dutch people between the age of 18 and 29 did not visit the dentist in 2021. The report of the German Federal Medical Association (Bundesärztekammer) supports these findings by stating that while the prevention-oriented utilization of dental checkups increased in other age groups, it stayed the same for young adults, with about 30% of them not going for checkups regularly (Bundesärztekammer, n.d.).

Nevertheless, the high prevalence of dental avoidance is just one part of the problem. Another issue is that studies found a direct link between dental avoidance and poor oral health (Beaton et al., 2014). More precisely, researchers could show a significant correlation between dental avoidance and missing teeth by comparing a group of dental patients who avoided the dentist with a group of patients who regularly claimed dental checkups (Henning Abrahamsson et al., 2001). The latter had significantly more filled teeth than the avoiding group (Henning Abrahamsson et al., 2001), suggesting that by regularly attending dental checkups, caries and other oral diseases are found and treated sooner so that the tooth can be saved. Furthermore, Thomson et al. (2010) studied people between the age of 15 and 32 to learn more about the influence of regular dental checkups on oral health. They found that people of all ages who regularly attended dental checkups had better-than-average oral health and fewer missing teeth due to caries. Additionally, these positive effects amplified the longer regular dental checkups were maintained (Thomson et al., 2010). These findings illustrate the importance of regular dental checkups for oral health in all age groups, especially young people.

To better understand dental avoidance, knowing why people avoid going to the dentist is essential. According to Bare and Dundes (2004), dental avoidance can be explained by

several factors, namely a perceived lack of time (36%), the belief that treatment is not needed (34%), cost (17%), and the fear of dentists (13%). The fear of dentists, also known as dental anxiety, can be further described as the excessive fear of oral manipulation (Beaton et al., 2014) and dental settings (Bryne et al., 2021). Multiple studies found a correlation between dental anxiety and fewer dental visits (Kazancioglu et al., 2017) and identified dental anxiety as a severe obstacle to attending dental services (Bryne et al., 2021). Dental anxiety affects approximately 25% of western society (Hoffmann et al., 2022). More specifically, it was found that dental anxiety affects females more than males as it is more commonly found and more severe among women (Akshaya et al., 2020). A study by Eitner et al. (2006) helped conclude the age group most affected by dental anxiety by calculating the mean anxiety score of 325 German men between the age of 19 and 54. The study revealed that the mean anxiety level was the highest for participants between the age of 19 and 29.

Characteristics of dental anxiety are its negative consequences on the patient's mental and physical condition. In addition to psychological stress, a study on Norwegian university students found that dental anxiety predicts poor Oral Health-Related Quality of Life (OHRQoL) and poor well-being (Halvari et al., 2019). Hence, the negative consequences directly affect the patient's well-being related to dental visits and the anxious patient's life and well-being in general. Moreover, patients suffering from dental anxiety can experience physiological symptoms, including a lower pain threshold, increased treatment complications, slower recovery after treatment, and increased post-treatment pain (Hoffmann et al., 2022). Moreover, they suffered more often from decayed or missing teeth than non-anxious patients (Kazancioglu et al., 2017). The negative consequences of dental anxiety can negatively impact dental avoidance, whereby the patient avoids going to the dentist even more.

Therefore, the relationship between dental anxiety, dental avoidance, and poor oral health can be further described as a *vicious cycle* (Beaton et al., 2014). The *vicious cycle* describes a series of events in which the response to a problem generates an effect that intensifies the original problem, worsening the situation (Merriam-Webster, n.d.).

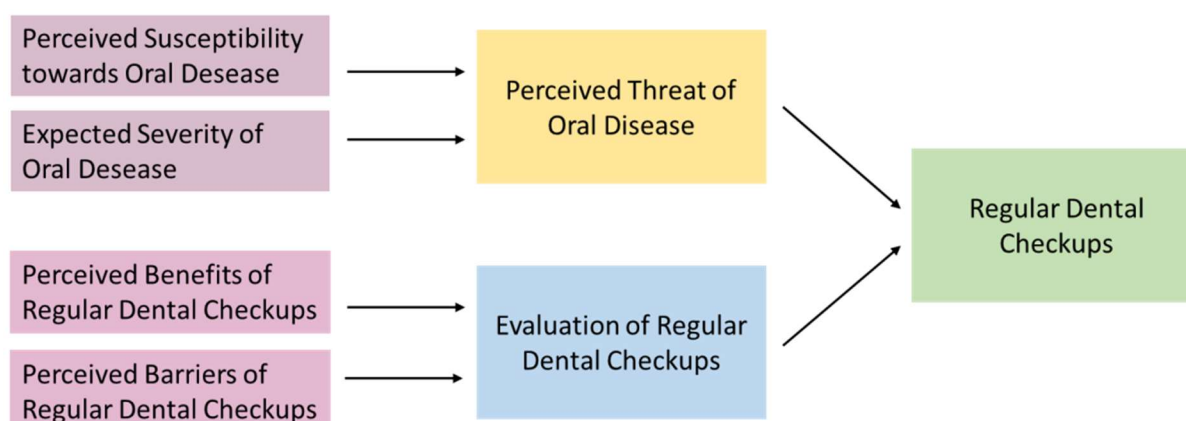
Accordingly, dentally anxious patients avoid going to the dentist, negatively impacting oral health (Beaton et al., 2014). By the time these patients go to the dentist, more severe oral manipulation is likely to be needed (Beaton et al., 2014). These procedures are prone to trigger anxious patients' fear; hence their dental anxiety and dental avoidance get reinforced; thus, it becomes less likely for those patients to visit the dentist regularly (Beaton et al.,

2014). Accordingly, the *vicious cycle* could be broken by reducing dental anxiety, resulting in more regular dental checkups and, accordingly, better oral health.

The *Health Belief Model* (HBM) highlights the importance of exploring strategies to reduce barriers toward regular dental checkups, as it is a well-established tool for explaining and predicting health behavior, especially preventative measures (Orbell et al., 2020). Applied to the dentist setting (see Figure 1), regular dental checkups represent the health behavior to be predicted. The probability of whether someone claims dental checkups regularly is influenced by the perceived threat of oral disease and the evaluation of regular dental checkups. The perceived susceptibility towards oral disease and the expected severity of such determines the perception of how threatening oral diseases are. In comparison, the perceived benefits of dental checkups and the perceived barriers determine the evaluation of regular dental checkups (Dorsch, n.d.). An example of the perceived benefits of regular dental checkups could be healthy teeth, no tooth decay, or no toothaches (Thomson et al., 2010). An example of perceived barriers to regular dental checkups could be a perceived lack of time, cost, and dental anxiety (Bare & Dundes, 2004). At best, perceived susceptibility, expected severity, and perceived benefits of dental checkups should be high, while perceived barriers should be low to execute appropriate oral health behavior (Xiang et al., 2020). Therefore, this research aims to learn more about patient's barriers toward regular dental checkups and find out how these barriers, especially dental anxiety, can be reduced or overcome.

Figure 1

The Health Belief Model Applied to the Dentist Setting



Altogether, the literature revealed the severe negative impact of dental avoidance and dental anxiety on patients' oral, physical, and mental health. Moreover, it became apparent that especially young adults between the ages of 18 and 29 are at risk for dental avoidance and dental anxiety. Consequently, this thesis will focus on the age group mentioned above. Due to the accessibility within the scope of this research, the sample population will be further reduced to university students from the University of Twente (UT). Although literature highlighted the importance of regular dental checkups, little is known about dental avoidance and anxiety in dental checkups, nor how to overcome it. Therefore, this research aims to identify barriers keeping patients from regular dental checkups and find ways to reduce or overcome them. A particular focus is placed on decreasing dental anxiety towards dental checkups, as this specific barrier was identified to play a role in breaking the vicious cycle.

Consequently, this paper is trying to answer the following research questions: What are the factors university students view as barriers to regular dental checkups? What are strategies to reduce or overcome the identified barriers? Which strategies for barrier reduction are especially applicable for patients with moderate to severe dental anxiety?

Methods

Design

For this research, a qualitative design was chosen, as it allows for the exploration of the experiences, feelings, and perceptions of the participants. By making use of a qualitative approach the researcher further expects to generate new strategies for barrier reduction toward dental checkups. Therefore, the research consists of a questionnaire (see Appendix A) comprised of open questions developed to learn more about the underlying factors of dental avoidance, the barriers towards regular dental checkups with a focus on dental anxiety and uncover novel strategies on how these barriers could be reduced. Further, each participant's individual dental anxiety score was calculated to categorize the developed codes by identifying patterns between dental anxiety scores and code frequencies. This research was planned and executed in collaboration with another researcher from the UT. Although, the final survey (see Appendix A) consisted of the materials of both parties, it was purposely designed to be quick to fill out, to set the inhibition threshold as low as possible to complete and was estimated to take 5 to 10 minutes.

Participants

Everyone who engaged with the survey via convenience sampling met the inclusion criteria of being a student at the University of Twente and between 18 and 29 years old. All participants who took part in the survey had to answer at least one open question to be part of the analyzed sample. The participants were recruited via convenience sampling through the online SONA system of the UT. Ethical approval was requested and granted from the ethics committee of the UT (approval number: 221277).

Materials

Dental Anxiety. The Dental Anxiety Scale (DAS) (see Appendix B) was used to measure the participants' level of dental anxiety. The questionnaire consists of four questions answered via a five-point Likert scale. The first answer (a) scored 1 point, whereas the last (e) scored 5 points. Therefore, scores between 4 and 20 are possible. If the patient scores between 4 and 8, the person is not rated as dentally anxious. Scores 9 to 12 are rated moderately anxious, 13 to 14 as highly anxious, and 15 to 20 as severely anxious, possibly phobic.

Questionnaire. The questionnaire (see Appendix A) was created using Qualtrics and was published in English. The questionnaire focused on i) barriers toward regular dental checkups to learn about patients' reasons for dental avoidance. Hence the question 'If you are visiting the dentist for preventative checkups less than once a year, what is stopping you from going there regularly?' (Q1) was asked. The following question 'What would help you go to the dentist for preventative checkups more frequently?' (Q2) aimed at ii) finding strategies to reduce or overcome the identified barriers. Lastly, two questions were asked to iii) discover which strategies for barrier reduction are especially applicable for patients with dental anxiety. Namely: 'What would help you to feel more comfortable when going to the dentist for a preventative checkup?' (Q3) and 'If you feel a little uneasy, tense or anxious when going to the dentist, what could reduce these feelings when going for preventative dental checkups?' (Q4). The questions Q1, Q2, and Q4 were determined by the researcher's curiosity and were designed to gather as much information about barriers and barrier reduction of dental avoidance and dental anxiety as possible. Question Q3 is based on a question from the questionnaire of Bare and Dundes (2004), which they asked in their survey on dental anxiety, namely, 'What might enhance [your] comfort in the office setting?'

Procedure

First, the participant was presented with the participant information sheet (see Appendix A) and was then asked to give consent to participate in the study. If the participant consented, they were asked to indicate their age and gender. They were then instructed to create a unique identification code in case they decided to withdraw from the study later. Afterward, the participant was presented with the DAS Scale. In the last part of the questionnaire, which provided the primary data for this research, the participant was asked to answer four open questions about the barriers to dental prophylactic visits and how these could be reduced. On average, participants spent 6.07 minutes answering the questionnaire.

Data Analysis

To analyze the qualitative data, which was collected through open questions in a questionnaire, an overarching coding scheme for all four open questions was developed, following an inductive approach. The inductive approach was chosen to ensure that the research results best reflect the raw data and are guided by its frequency and importance rather than by a predefined framework (Thomas, 2003). The researcher started the coding process by reading every given answer and noting the individual themes. Next, the researcher tried to find overarching categories for the found themes and went back to the raw data to code the whole data set with the newly developed coding scheme. The researcher repeated this cycle several times, hence the coding process was iterative and circular. The constant adaption of the codes was applied to ensure mutual exclusiveness. Therefore, the researcher reviewed whether a piece of raw data qualified for two different codes simultaneously and adjusted the coding scheme if this occurred. After coding the whole dataset four times, a second researcher coded 15 answers from the raw data using the developed coding scheme to improve the coding scheme and ensure interrater reliability. The second researcher's feedback was implemented before the coding scheme was presented to the researcher's supervisor and revised according to his suggestions. This process was repeated one more time until the final version of the coding scheme was developed. Finally, the number of times each code was mentioned was counted, allowing a better insight into the weighting of each code to differentiate between codes that were mentioned frequently and codes that were mentioned rarely. Participant's mean anxiety scores, derived from scoring the DAS, were calculated using Microsoft Excel.

Results

Sample Characteristics

In total, 82 people participated in the online survey. One participant had to be excluded from the sample due to not answering the questionnaire. Additionally, 6 participants had to be excluded from the sample because they did not answer the open questions of the survey (see Appendix A) and were therefore not used for the analysis. Thus, the total sample consisted of 75 participants. *Table 1* provides more detailed information on the sample characteristics.

Table 1

Sample Characteristics

	Sample
Total	75
Female	60
Male	14
Diverse	0
Prefer not to say	1
Age range in years	18 to 27
M _{age} in years	20.8
SD _{age}	2.06
Manxiety	9.5

To answer the research questions, the raw data (see Appendix C) was transferred into a coding scheme which will be presented and explained in the following section. Each code description will be divided into three parts, intended to answer one of the three research questions. The answers to the open question Q1 will later be used to answer the first research question, the responses to Q2 will be used to answer the second research question and the responses to the questions Q3 and Q4 will be used to answer the third research question.

Dental Staff – Patient - Relationship

Coding the data from Q1 showed that participants viewed it as barriers toward regular dental checkups if their dentist was accusing them of not attending dental checkups regularly or of being accountable for their own (poor) oral health. Further, participants worried about what the dental staff might think of their teeth. For example, one participant wrote: ‘they might judge you for your teeth.’ Lastly, it was mentioned that critique from the dental staff was perceived as a barrier as well as not liking the dentist or thinking the dentist is incompetent.

Coding the data from Q2 showed that having a friendly dentist was mentioned several times as a strategy to reduce the barriers toward regular dental checkups. Similarly, one participant wrote: ‘a good dentist who can calm one self.’ Participants further mentioned that it would help them attend dental checkups more frequently if their dentist was more careful, if the service felt familiar and if they felt more comfortable with their dentist in general. Moreover, participants answered that they would go to dental checkups more regularly if they were sure that the dental staff was not going to get mad or disappointed and would not criticize them. Lastly, one participant answered: ‘Receiving positive feedback from [the] dentist occasionally.’

Coding the data from Q3 and Q4 showed that anxious patient’s experienced less anxiety if their dentist and the dental staff was nice and friendly. More specifically, anxious patients liked their dentists and dental staff to be polite, careful, kind, understanding, and empathic. Furthermore, participants preferred a talkative dentist and some patients mentioned that they would feel more comfortable at dental checkups if their dentist was female. One participant wrote that they liked ‘when the de[n]tist would take his time and not just start working right away.’ Another theme several participants mentioned was a non-judgmental dental staff, as for example one participant wrote: ‘If they were not as judg[.]mental as they are.’ Moreover, participants preferred not to be accused or criticized by their dental staff, and they did not like if the dental staff showed signs of disappointment. Additionally, participants wanted the dentist to acknowledge their feelings and they want to feel seen and heard as an anxious patient. Two exemplary quotes from the data are: ‘The dentist talking about anxiety and fear and patients, how it is normal, how they are happy to cooperate and take me into consideration [...]’ and ‘[...] that they will listen to me and my feelings.’ Lastly, several patients mentioned that it would help them to feel more comfortable at dental checkups if they knew their dentist personally, yet they did not specify why this would help them.

Miscellaneous

The second code is a collection of answers that were irrelevant. One reason an answer was categorized as irrelevant and therefore coded as *Miscellaneous* was because they did not answer the question asked, as for example the answer ‘[...] maybe a bit more fear appeal for what happens if I don’t go on a regular basis’ to the question ‘What would help you to feel more comfortable when going to the dentist for a preventative checkup?’ as it is unlikely that an increased fear appeal would increase someone’s feeling of comfort in a stressful situation. The other reason for categorizing answers to be irrelevant was if the participant had replied to a question that did not apply to them, as in these examples: ‘I go once a year, which is pretty regular[I]y’, ‘I do not feel uneasy, tense or anxious’, or ‘Not sure.’

Information

Coding the data from Q1 showed that only one person perceived a lack of information as a barrier toward regular dental checkups as this person is an international student in the Netherlands and does not have any information on the Dutch system regarding dental checkups.

Coding the data from Q2 showed that the information patients would like to receive to claim dental checkups more frequently is mainly related to the consequences of not doing so. Examples from the data are: ‘Clear communication about what I risk losing with regards to dental health if I do not keep up with hygienic routines and check-ups’, ‘fear appeal’, and ‘[...] more knowledge about consequences. More knowledge of why one should go regular[I]y to the dentist.’ Furthermore, one person answered that they would like to receive more information about dentists in the Netherlands.

Coding the data from Q3 and Q4 showed that the most frequently given answers evolved around knowing what to expect from the dental checkup. Participants mentioned that they would like to know exactly what the dentist is going to do, what they will be feeling, and what each machine is used for. Some participants specifically answered that they would like to receive the information before the treatment as for example these participants suggested: ‘maybe a checklist before going to know what will happen’ and ‘a talk with the staff on the p[h]one when making an appointment and she tells me [...] what the exact procedure will be’, whereas other participants requested to receive the information during the treatment as stated in this answer: ‘[I]f the dentist explained to me what they were doing during the check up.’ The examples mentioned above also illustrate that some participants preferred to be informed

by the dental assistant or dental staff in general whereas others would like to receive the information from their dentist.

Fear & Pain

Coding the data from Q1 showed that there are two main themes viewed as barriers toward regular dental checkups. The first one is fear in general, the fear of needles, the fear that something is wrong with the participants teeth, the fear of noises related to dental settings, and the fear of needing to take medication. Next to the fear of needles, one participant also mentioned: 'I am also scared they will change what my teeth look like, or be unable to speak because they are working with/ in my mouth.' The second theme was the (the fear of) uncomfortable feelings and pain. Representative examples from the data are: 'I'm afraid of pain' and 'the check ups are painful.'

Coding the data from Q2 showed that only one person mentioned this code as a barrier reduction strategy toward more frequent dental checkups. The person wrote: 'If it didn't hurt.'

Coding the data from Q3 and Q4 showed that the most frequently mentioned theme was the avoidance of pain. Some participants just stated their need, like these participants: 'Knowing I won't be in pain' and '[I]f it wouldn't hurt', whereas other participants were more specific which part of the procedure they wished was less painful, as in this example from the data: '[I]f the cleaning of your gums was less unpleasant'. Other participants came up with explicit ideas how to achieve the reduction of pain during dental checkups, as for example one participant wrote: 'Numbing medication so I can't feel what the dentist is doing in my mouth.'

Perceived Need of Checkups

Coding the data from Q1 showed that the most frequently mentioned barrier was the perception that (regular) dental checkups are not needed. Mostly this perception was justified by stating that the participant has or always had healthy teeth and good oral health. Some examples from the data are: 'Normally there is nothing wrong with my teeth, it is always a checkup where I sit in the chair for 5 minutes and then [I] can leave, [...]. I think it is therefore not necessary to go every 6 months', 'It's not one of my top priorities as I have yet to have any major problems with my teeth', or 'I think my dental health is good and my dentist always said it too, so I think I am fine not going until something happens.' Another frequently mentioned theme was the participants laziness, which was also often justified with

having healthy teeth as for example these participants wrote: ‘Mostly it is only laziness that prevents me from going there. As I had no problems anyway I did not perc[ei]ve it as a problem to engage in’ and ‘the effort of going there’.

Coding the data from Q2 showed that participants were aware that it would help them to go to dental checkups more regularly if they perceived it as more important. Exemplary answers are: ‘more perceived importance’, ‘motivation’, ‘seeing the urgency’, and ‘Having more troubles.’ Another person wrote: ‘I have to be less lazy.’

This code was not mentioned in the data for Q3 and Q4.

Cost

Coding the data from Q1 showed that within this code high cost of dental checkups was the only reason preventing the participants from claiming regular dental checkups. Some examples from the data are: ‘I don’t want to sound wrong but the amount of money I have to leave there makes me not want to go’, ‘I cannot afford it’, and ‘Now that I am older and pay my own insurance/ medical bills it is also just expensive to go to the dentist.’

Coding the data from Q2 showed that it was very similar to the data from Q3 and Q4. Two themes were most frequently mentioned by the participants. First, the wish for cheaper dental checkups and second their health insurance covering dental checkups. An example that combined both themes was: ‘If it was covered by my health insurance, or if it was cheaper.’ Another idea of a participant was to receive ‘a (financial) reward from [their] insurance’.

Availability

Coding the data from Q1 showed that one reason holding the participants back from claiming regular dental checkups was the distance to the dental office. This was especially the case for students who recently moved or live abroad. Exemplary answers from the data are: ‘First of all the distance, since my dentist is in my hometown which is four hours away from where [I] study’, and ‘moved out of the country for half a year.’ Another barrier that was mentioned by several participants was the poor availability of appointments as for example this person wrote: ‘I get an appointment too late’ as well as long waiting times.

Coding the data from Q2 showed that the most frequently mentioned themes were closer proximity to the dental office and shorter waiting times for appointments as for example these answers portray: ‘Also having a dentist check up near where [I] live would

make more sense’, and ‘shorter waiting times.’ Another answer was ‘easier availability’, yet the answer did not specify what the student needed to be easier available.

Coding the data from Q3 and Q4 showed that the code was not mentioned frequently within these questions. When they were mentioned, the answers were very specific. Two persons requested not having to wait in the waiting room before the appointment, whereas another person was seeking afternoon appointments and good public transport in order to ‘arrive as stress-free as possible.’

Environment

Coding the data from Q1 showed that this code was not relevant for answering the first research question as the code was not mentioned in the data of Q1.

Coding the data from Q2 showed that the code was not mentioned frequently. The two times it was mentioned the participants requested a nice environment and a good atmosphere.

Coding the data from Q3 and Q4 showed that this code was frequently mentioned. Participants stated their need for a comfortable, friendly, and clean dental office. More specifically, the students described the ideal interior design as a place with ‘less cold lighting’, less minimalistic, less white walls and white furniture. Instead, the participants would feel more comfortable in a place with differently colored walls and furniture, as for example these two students stated: ‘Having pastel/ toned down colours for interior decoration would make it better, since it takes “the edge” off the environment whilst keeping it classy’ and ‘Different colors in rooms or clothing of doctor, not everything in white.’ Another element that was mentioned frequently was music. The answers differed in the precision, as some students only wrote ‘music’, whereas others specified what kind of music they would like to hear at the dentist, for example calming or relaxing music and one person further specified that they would prefer ‘Music in the waiting room that I like.’ One person pointed out that they did not like the setup of some dental offices where all rooms are connected, as this intensifies the noises from the other rooms, whereas another person wrote: ‘A nice setting, not too many people in the waiting room’ as a request for the environment at the dental office. A few participants expressed specific elements at the dental office, such as cats in the waiting room, receiving treats after the treatment or having flavored toothpaste.

Appointment System

Coding the data from Q1 showed that the appointment system was not mentioned often as a barrier toward regular dental checkups. When it was mentioned, it became clear that students did not like to call to make an appointment, as for example this participant wrote: ‘I don’t like to call, so I try to put it off as much as possible.’

Coding the data from Q2 showed that many students had the need for a change in the appointment system of dental offices. Some people stated their needs more general as they requested that they did not want to call to make an appointment or requested ‘easier appointment booking’, whereas others were more specific and requested the establishment of an online booking system. An exemplary answer from the data is: ‘online booking so I can book quicker and in advance.’ Other, less frequently mentioned ideas were getting a new appointment upon leaving the dental office and fixed or automatically scheduled appointments.

Coding the data from Q3 and Q4 showed that this code was rarely mentioned to answer the third research question. The few answers including this code requested for an online appointment system and automatically scheduled appointments.

Forgetfulness & Reminders

Coding the data from Q1 showed that forgetfulness was frequently mentioned as a reason for infrequent dental visits. Several students wrote: ‘I forgot to make an appointment’ and one person stated: ‘I sometimes forget that it’s already time to have a dental check up.’

Coding the data from Q2 showed that it was frequently requested to receive reminders from the dental office. An exemplary answer from the data is: ‘If they would reach out to me, I often forget that it’s time again.’ Other students requested the dentist to tell them when to come for a dental checkup, the dentist calling the patient to make an appointment, or the student thought it would make sense to set themselves a reminder to book an appointment once a year.

Coding the data from Q3 and Q4 showed that this code was not mentioned as an answer to the third research question.

Social Support

Coding the data from Q1 showed that too little social support was not viewed as a reason for infrequent dental visits by the participants.

Coding the data from Q2 showed that the students thought they would go to the dentist more frequently if they felt more social support. This looked differently for all participants as one person stated that they would like ‘to be encouraged more’ without specifying whom they would like to be encouraged by. Someone else mentioned that it would help them if ‘a secretary or parental figure [would tell them] to go [to the dentist]’, whereas another participant would prefer to be supported more by family and friends and another student answered that they would go to dental checkups more regularly if they had someone accompanying them.

Coding the data from Q3 and Q4 showed that the students would appreciate to feel reassured as in this example by a participant: ‘Assurance that it will be fine’, and being accompanied, as for example one person wrote: ‘Taking someone with me I feel comfortable with.’ Someone else answered that it helped them to talk to someone about the situation, whereas another student was more specific, writing: ‘A talk with the staff on the p[h]one when making an appointment and she tells me to be calm [...].’

Lack of Time

Coding the data from Q1 showed that a lack of time or poor time management was frequently mentioned as a reason for infrequent dental visits, as these examples from the data show: ‘Too little time’ and ‘because of time management issues.’

Coding the data from Q2 showed that only few students mentioned that it would help them going to dental checkups more regularly if they had more time, although two people wrote: ‘Having the time to go’ and ‘That I would have more time.’

Coding the data from Q3 and Q4 showed that this code was not mentioned in regard to the third research question.

Fewer Dental Concerns

Coding the data from Q1 showed that this code was not mentioned regarding the first research question.

Coding the data from Q2 showed that two students perceived fewer dental concerns as a support in going to the dentist more frequently. One participant wrote: ‘Less problems regarding to teeth’ and another participant answered: ‘going to the dentist and they have to do nothing because everything was fine.’

Coding the data from Q3 and Q4 showed that several participants wish for fewer dental concerns, as several participants stated the general wish of ‘knowing that everything will be fine and [their] teeth are well.’ Although many students expressed this wish, one person acknowledged that its fulfillment is unrealistic by writing: ‘Knowing that there is no problem with my teeth but that[‘]s kind [of] impossible.’ Another participant was realistic by answering ‘[I] think nothing except for taking better care of my teeth, as the anxiety stems from the experience of pain and uncomfortability when something needs to be done.’ Lastly, one student came up with a solution and suggested: ‘Maybe a tool or something that stimulates me to brush my teeth more (properly). If you have ‘good’ teeth, there is nothing to fear, right?’

Control

This code was only relevant for answering the third research question. Coding the data from Q3 and Q4 showed that this code was frequently mentioned to answer the third research question. One theme that was mentioned several times was the development of a stop signal together with the dentist and deciding to take breaks. Answers reflecting this theme were: ‘to develop a sign to stop when panic gets too crazy’ or ‘Taking a break.’ The second frequently mentioned theme was having a choice regarding treatments to be carried out, shown in this answer: ‘the choice what needs to be done in the moment.’

Routines

Coding the data from Q1 showed that not having gotten in the routine of regular dental checkups was viewed as a barrier toward regular dental checkups. This becomes visible in the following answers: ‘Ever since [my childhood I] have never gotten in the habit of going to the dentist’ and ‘I have never been for a preventative check up before.’ Someone also answered that they were unable to stick to routines.

Coding the data from Q2 showed that this code was not mentioned regarding the second research question.

Coding the data for Q3 and Q4 showed that without further explaining it, some students thought it would help them feeling more comfortable at dental checkups if they went to the dentist more regularly.’ Another student explained it the following way: ‘If [I] would do it regularly [I] think this fear would automatically fade away if my previous visits were alright’ and someone else found a similar explanation writing: ‘Going there regularly so the “damage” is not that big that it hurts too bad.’

Other Illnesses and Disorders

This code was only mentioned for answering the first research question. When coding the answers from Q1 it showed that some other illnesses or mental disorders were mentioned as reasons for the participant's difficulties with regular dental checkups. Health issues mentioned in the data were depression, borderline personality disorder, social anxiety, and not further specified 'health issues.' One participant with social anxiety stated: 'I just deal with social anxiety in general and [do not] like when people get close to me, which is why I am not totally relaxed at the dentist.'

Self-Soothing Techniques

This code was only mentioned for answering the third research question. When coding the data from Q3 and Q4 it showed that this code covers techniques mentioned by the participants to calm themselves down when perceiving uncomfortable feelings at a dental checkup. Most participants mentioned positive affirmations like 'Telling myself that everything is going to be fine even if they find something bad' or 'Telling myself that I will eventually get out of the situation.' Most participants mentioning positive affirmations used affirmations that contained the message that the dental checkup is temporary and that they will get out of the situation. Another participant mentioned that they '[...] would use some breathing exercises' to calm themselves at the dentist.

Covid Pandemic

This code was only mentioned for answering the first research question. When coding the answers from Q1 it showed that some people mentioned the COVID Pandemic as a reason they did not visit the dentist regularly in the past years. The participants did not specify whether they did not visit the dentist because they feared getting infected or for other underlying reasons. They only stated: 'The last years it has mostly been Corona.'

Frequencies of Codes

Table 2 gives an overview of the frequency of occurrence of each code in the raw data. The frequency was counted per question (Q1 to Q4) as well as in total to allow an in-depth analysis, as the four open questions (Q1 to Q4) answer different aspects of the research question. The codes are sorted from most frequently mentioned to least frequently mentioned.

Table 2

Code Frequencies

Codes	Frequencies					Total	Exemplary Quote
	Q1	Q2	Q3	Q4			
Dental Staff – Patient - Relationship	5	14	25	23	67	‘a good dentist who can calm one self’	
Miscellaneous	15	7	22	16	60	‘I visit my dentist every 6 months for check ups’	
Information	1	12	9	16	38	‘dentists who inform me about what they are going to do’	
Fear & Pain	21	1	6	8	36	‘I am scared what they do will hurt and I'm very afraid of needles’	
Perceived Need for							
Dental Checkups	28	8	0	0	36	‘It's not one of my top priorities’	
Cost	10	12	5	1	28	‘Make it less expensive or have it covered by my medical insurance ’	
Availability	11	6	4	1	22	‘Shorter waiting times’	
Environment	0	2	15	2	19	‘Music in the waiting room that I like’	
Appointment System	3	12	1	0	16	‘Having to call to make an appointment’	
Forgetfulness & Reminders	5	10	0	0	15	‘maybe send some more reminders so I dont forget’	
Social support	0	5	1	5	11	‘taking someone with me’	
Lack of Time	9	2	0	0	11	‘Poor time Management’	

Fewer Dental Concerns	0	2	1	7	10	‘Less problems regarding to teeth’
Control	0	0	3	4	7	‘to develop a sign to stop when panic gets too crazy’
Routines	3	0	1	2	6	‘i have never really gotten in the habit of going to the dentist’
Other Other Illnesses and Disorders es	2	0	0	0	2	‘I just deal with social anxiety in general [...]’
Self-Soothing Techniques	0	0	1	4	5	‘I would use some breathing exercises’
Covid Pandemic	2	0	0	0	2	‘During and after COVID I did not make a new appointment’

Table 2 shows results that deserve to be highlighted as they were explicitly mentioned to answer the two questions about dental avoidance (Q1 and Q2) or dental anxiety (Q3 and Q4). The codes *Perceived Need for Dental Checkups*, *Forgetfulness & Reminders*, *Lack of Time*, and *Covid Pandemic* were only mentioned to answer the questions about dental avoidance. In contrast, the code *Self-Soothing Techniques* was only mentioned as the answer to the dental anxiety questions.

Table 3 displays the code frequencies itemized into the participants' anxiety scores. To determine the anxiety scores, the DAS scores of the 64 participants who responded to the open questions were evaluated and assigned to one of four categories. The number of participants who were categorized as *not anxious* was 38 (scores from 4 to 8), 18 participants were *moderately anxious* (scores from 9-12), 15 participants were *highly anxious* (scores from 13 to 14), and 4 participants were *severely anxious* (scores from 15 to 20).

Table 3

Percentage of Participants who mentioned each Code grouped per Anxiety Score

	4-8	9-20	9-12	13-14	15-20
Number of Participants per Group	38	37	18	15	4
Dental Staff – Patient - Relationship	18%	46%	44%	47%	50%
Miscellaneous	61%	35%	50%	27%	0%
Information	26%	32%	22%	40%	50%
Fear & Pain	11%	41%	39%	40%	50%
Perceived Need for Dental Checkups	32%	19%	22%	13%	25%
Cost	16%	19%	22%	20%	0%
Availability	21%	24%	22%	33%	0%
Environment	13%	22%	28%	20%	0%
Appointment System	13%	19%	17%	13%	50%
Forgetfulness & Reminders	18%	16%	22%	13%	0%
Social Support	8%	16%	11%	20%	25%
Lack of Time	18%	8%	11%	0%	25%

Fewer Dental Concerns	5%	19%	11%	27%	25%
Control	0%	19%	11%	20%	50%
Routines	8%	16%	22%	13%	0%
Other	0%	8%	6%	13%	0%
Illnesses and Disorders					
Self-Soothing Techniques	11%	3%	6%	0%	0%
Covid Pandemic	3%	3%	6%	0%	0%

Discussion

The first aim of this research was to i) gain a better understanding of the barriers university students face toward regular dental checkups. The results allowed to identify the following barriers: a poor dental staff – patient – relationship accompanied by the patient feeling uncomfortable, judged, and criticized. Further, dental anxiety and the fear of pain, the perception that regular dental checkups are not needed, laziness, the high cost of dental checkups and health insurance not covering the cost, far distances to the dental office and poor availability of appointments could be identified as frequently mentioned barriers toward regular dental checkups. Less frequently mentioned barriers are having to call to make an appointment, forgetfulness, a lack of time and poor time management, not having gotten in the routine of regular dental checkups, health issues including mental disorders, and the covid pandemic.

The second aim was to ii) find strategies to reduce or overcome the identified barriers. The most frequently mentioned strategies were having a friendly dentist and a good dental staff – patient – relationship, having more knowledge on the negative consequence of infrequent dental visits, perceiving regular dental checkups as more important, reducing the

cost of dental checkups or having it covered by health insurance, closer proximity to the dental office, shorter waiting times, the option to book appointments online, receiving reminders by the dental office, and having a more supportive social environment.

The third aim was to iii) identify which strategies for barrier reduction are especially applicable for patients with moderate to severe dental anxiety. A good dental staff – patient – relationship was one of the most frequently mentioned strategies for barrier reduction and played a role for 46% of anxious patients. Further strategies were receiving information about the procedure of dental checkups, specific interior of dental offices such as warmer lighting and less white and minimalistic interior, receiving social support by being reassured and accompanied to the dental checkup, and having control over the situation by for example agreeing on a stop-signal with the dentist. Strategies that were mentioned less often or categorized as unrealistic were not having to wait in the waiting room, fewer dental concerns, not experiencing pain at dental checkups, and going to dental checkups more regularly.

Many of these findings can be supported by existing literature. For example, the identified reasons for dental avoidance by Bare and Dundes (2004) are similar to the most frequently named barriers towards regular dental checkups of this research, with the difference in the additionally found barrier *Availability*.

Connected Codes. During the coding process it became noticeable that participants with anxiety scores between 9 and 20 (categorized as having moderate to severe dental anxiety) who mentioned the code *Control* also oftentimes mentioned the code *Information* when answering Q3 and Q4. It seems like the two codes share a common connection, which could be fearing the unknown. The combination of receiving information about what is done during the procedure and being in control of stopping the procedure might aid this fear in anxious patients.

Another connection that might be drawn from the data is the connection between the code *Appointment System* and the codes *Lack of Time* and *Availability*. The connection could be made as several participants with dental anxiety scores between 4 and 8 (categorized as not anxious) who mentioned *Appointment System*, *Lack of Time*, or *Availability* as a barrier toward regular dental checkups mentioned *Appointment System* and especially the ability to book appointments online as a barrier reducing strategy. Some explained this by arguing it was more convenient as this allowed them to avoid calling the dental office, saved time and allowed the participant to book appointments in advance.

A third connection could be made between the code *Fear & Pain* and *Fewer Dental Concerns* as the data clearly showed that the need to have fewer dental concerns stemmed from the wish to avoid pain and therefore the fear at dental checkups. Both codes were much higher for the group of anxious patients (scores between 9 and 20) than the group of people categorized as not anxious (scores between 4 and 8).

A further connection could be made between the codes *Information* and *Perceived Need for Dental Checkups*. The reason could be that the strategies *Information* and *Perceived Need for Dental Checkups* aim at increasing the perceived susceptibility and the expected severity and, therefore, the threat appraisal, which would, according to the HBM, increase the student's probability of claiming regular dental checkups.

Lastly, it became visible that except for the codes *Lack of Time*, *Other Illnesses & Disorders*, and *Covid Pandemic*, each code that was mentioned as barrier in Q1 was later mentioned as strategy for barrier reduction strategy in either Q2 or Q3 and Q4. This might be explained by the fact that all these barriers are difficult to reduce and might therefore not been mentioned. Although other unrealistic strategies for barrier reduction have been mentioned by the participants.

Practical Implementation

As a result of this research's recognitions, several recommendations for implementing the most critical strategies for barrier reduction toward regular dental checkups can be made. First and most importantly, dentists and dental staff should be made aware and trained in contact with patients in general but especially those with dental anxiety. Hence approaching patients should either be part of their curriculum or could be learned during a training course. In this context, special focus should be put on building a positive professional relationship with the patient, holding back on criticism, and clearly communicating to the patient that they will not be judged and therefore must not be ashamed for their oral health status.

Next, patients should be provided with more information about the importance and the possibilities of regular dental checkups and increase patients perceived importance toward dental checkups by making them aware of the risks of irregular dental checkups, especially in early age. Further information every participant should receive concerns the exact sequence of events of the dental procedure. The former could be realized by implementing it in high school and university education. In contrast, the latter must be implemented in dental offices individually, entailing a checklist with the essential information about what will be done

during the procedure, what to expect, and which signals the patient can use to communicate to the dentist that they need a break from the procedure. The dental staff should discuss this checklist with the patient to ensure they have understood everything and clarify the remaining questions. Moreover, the dentist should learn to verbalize what they are doing during the procedure and explain which function each tool fulfills.

Further, the cost of dental checkups should ideally, at least partially, be covered by health insurance, as it is already a common practice in Norway (Helse Norge, n.d.). Young Norwegian adults between the age of 19 and 26 only pay for 25 to 50 percent of each dental treatment, through which the government tries to reduce the discrimination of financial disadvantages toward regular dental checkups (Helse Norge, n.d.).

Moreover, by implementing some of the anxious patients' suggestions for a more comfortable environment at the dental office, anxious patients' level of anxiety could be alleviated. These suggestions include less cold lighting, the office to be less minimalistic, and in general less white interior. Instead, patients would like to see differently colored walls, for example pastel colors. Moreover, patients would feel more comfortable if the dental staff would wear other colors than white. Additionally, calming, or relaxing music could be played in the dental office for the patients to enjoy.

Lastly, dental offices could reduce their patients' barriers to regularly claiming dental checkups by providing the opportunity of booking appointments online and sending automated reminders to book an appointment, as some modern dental offices already do.

Limitations and Future Research

Although the study's design was carefully considered, limitations and suggestions for improvement can be made retrospectively. The first limitation was the participant's difficulty to differentiate between Q3 and Q4 in the questionnaire (see Appendix A). Hence participants often gave similar or the same answers for both questions. This could have altered the research results, which has been counteracted by analyzing the data (displayed in Table 3) in a way that each code was counted only once per participant, allowing for a comparison between the non-anxious group and the anxious group, although two similar questions have been asked about anxious participants' perceptions. Nevertheless, the similarity of Q3 and Q4 impeded the collection of ideas about strategies that could be implemented by the participants to feel more comfortable at dental checkups. Therefore, a wider variety of strategies could have been collected by differentiating the two questions into one question about the dentist's strategies to

make the patient more comfortable and one question about the participant's strategies to feel more comfortable at dental checkups.

A second limitation could be that the collected data, including the anxiety scores, is based on self – disclosure which is always subjective and prone to social – desirability bias. Although this could not be counteracted completely, especially as this researched was dependent on people’s subjective opinions, an attempt to minimize its effects was made by collecting the data online. As altered data could influence generalizability, it would be interesting to conduct an experimental study with the identified strategies of barrier reduction as independent variables. By varying the experiments target group, the generalizability of the findings could even be tested among different age groups. It would of course be important to follow ethical guidelines to ensure the participants well-being. Virtual Reality could be utilized to safe costs and improve the practicability of the experimental design.

Conclusion

Overall, the findings suggest that dental avoidance and dental anxiety related to dental checkups show commonalities with dental avoidance and dental anxiety related to dental interventions in general, with the difference of an additional barrier, namely *Availability*. Furthermore, the following strategies for barrier reduction could be identified: *Dental Staff – Patient – Relationship, Information, (the reduction of) Fear & Pain, Perceived Need for Dental Checkups, Cost, Availability, Environment, Appointment System, Forgetfulness & Reminders, Social Support, Fewer Dental Concerns, Control, and Self-Soothing Techniques*. For all strategies it could be identified how important these were for people with tendencies of dental avoidance and for people with tendencies of dental anxiety. Despite the limitations of the questionnaire, the large sample size allowed the author to collect a large amount of data, which helped answer all three research questions. This enabled the author to better understand students' barriers at dental checkups and provided multiple recommendations for barrier reduction for students, especially those with dental anxiety. Further, the qualitative approach paired with the large sample size led to the discovery of several novel solutions to the problem of dental avoidance and dental anxiety which most likely would not have been found if another design would have been applied. Through the work of this research, the first step towards more regular and stress-free dental checkups in students has been made and paved the way for further, more generalizable research.

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Appendices

Appendix A

Questionnaire Participant Information Sheet and Consent Form**

Welcome and thank you for your interest in our study!

In the following we would like to provide you with some information about the survey and how your data will be handled.

If you agree to participate in this research, you will be asked to answer a short questionnaire which will take you approximately 15 minutes. The questions will cover the following topics: the fear of dental visits, habits of going to the dentist, dental avoidance and self-efficacy. The research is supervised by Rick Pinkster. It is designed in a way to minimize any risks for the participants. Risks include feelings of discomfort when answering the questions. If participation in this study causes you any concerns, anxiety, or distress, please do not hesitate to contact the UT student counselling (<https://www.utwente.nl/en/ces/sacc/coachingcounselling/student-counsellor/>).

Your participation in this study is completely voluntary and you may refuse to complete the study or withdraw from the study at any time. You may also skip any question that makes you feel uncomfortable without justifying your decision. If you decide to withdraw from the study after completing the survey, please send one of the researchers an email with your participation code (which you will receive at the beginning of the study) until November 20th, 2022.

All data from this study will be kept from inappropriate disclosure and will be accessible only through the university of Twente and to the researchers and their supervisors until the 1st of November 2024. Your name will not be connected to your responses or results and data will

be handled completely confidential. If you would like to receive information about the outcomes of this study, or have any questions or concerns please contact one of the researchers via e-mail:

Hennig, Lena (l.hennig@student.utwente.nl)

Warschat, Victoria (v.m.warschat@student.utwente.nl)

I confirm that I have read and understood the participant information

I have had the opportunity to consider the information, ask questions, and have had these answered satisfactorily.

I understand that in order to take part in this study, I need to be between 18 and 29 years old.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that my data is anonymous and will be stored on secure university servers and that it will only be used for research purposes.

I consent to take part in this study.

I consent

I do not consent

*General Questions**

Please enter the first two numbers of your birth date, the last two letters of your last name and the first letter of your favourite colour. Please save this code as you will need it as identification in case you want to withdraw from the study. [*Open Question**]

Age [*Open Question**]

Gender

Male

Female

Diverse

Prefer not to say

*Frequency**

How many months ago was the last time you went to the dentist for a preventative check-up?

[Open Question]*

How often do you visit the dentist for preventative check-ups?

Every 6 months

Every 12 months

Every 18 months

Every 24 months

Less than every 24 months

*Dental Anxiety Scale (DAS)**

1. If you had to go to the dentist tomorrow for a checkup, how would you feel about it?
 - a. I would look forward to it as a reasonably enjoyable experience.
 - b. I wouldn't care one way or the other.
 - c. I would be a little uneasy about it.
 - d. I would be afraid that it would be unpleasant and painful.
 - e. I would be very frightened of what the dentist would do.

2. When you are waiting in the dentist's office for your turn in the chair, how do you feel?
 - a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.

3. When you are in the dentist's chair waiting while the dentist gets the drill ready to begin working on your teeth, how do you feel?
 - a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.

4. Imagine you are in the dentist's chair to have your teeth cleaned. While you are waiting the dentist or hygienist is getting out the instruments which will be used to scrape your teeth around the gums, how do you feel?
 - a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.

*General Self-Efficacy Scale**

Next, you are asked to indicate to what extent you agree with the following statements:

(Options per statement were: Not at all true, Hardly true, Moderately true, Exactly true) -*

I can always manage to solve difficult problems if I try hard enough.

- If someone opposes me, I can find the means and ways to get what I want.
- It is easy for me to stick to my aims and accomplish my goals.
- I am confident that I could deal efficiently with unexpected events.
- Thanks to my resourcefulness, I know how to handle unforeseen situations.
- I can solve most problems if I invest the necessary effort.
- I can remain calm when facing difficulties because I can rely on my coping abilities.
- When I am confronted with a problem, I can usually find several solutions.

- If I am in trouble, I can usually think of a solution.
- I can usually handle whatever comes my way.

*Dental Avoidance**

Have you ever avoided seeking dental treatment for as long as possible?

yes

no

Have you ever avoided seeking dental treatment because you were afraid of visiting the dentist? yes

no

*Barriers & Barrier reduction [Open Questions] **

If you are visiting the dentist for preventative check-ups less than once a year, what is stopping you from going there regularly?

What would help you to feel more comfortable when going to the dentist for a preventative check-up?

What would help you going to the dentist for preventative check-ups more frequently?

If you feel a little uneasy, tense or anxious when going to the dentist, what could reduce these feelings when going for preventative dental check-ups?

*(*everything written in italics was not visible for the participants)*

Appendix B

Dental Anxiety Scale (DAS)

5. If you had to go to the dentist tomorrow for a checkup, how would you feel about it?

- a. I would look forward to it as a reasonably enjoyable experience.
 - b. I wouldn't care one way or the other.
 - c. I would be a little uneasy about it.
 - d. I would be afraid that it would be unpleasant and painful.
 - e. I would be very frightened of what the dentist would do.
6. when you are waiting in the dentist's office for your turn in the chair, how do you feel?
- a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.
7. When you are in the dentist's chair waiting while the dentist gets the drill ready to begin working on your teeth, how do you feel?
- a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.
8. Imagine you are in the dentist's chair to have your teeth cleaned. While you are waiting the dentist or hygienist is getting out the instruments which will be used to scrape your teeth around the gums, how do you feel?
- a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in sweat or almost feel physically sick.

Scoring the Dental Anxiety Scale (DAS)

(This information is not given to the participant)

a=1, b=2, c=3, d=4, e=5 Anxiety rating:

- 4 – 8 = not anxious
- 9 – 12 = moderately anxious
- 13 – 14 = highly anxious
- 15 – 20 = severely anxious (or phobia)

Appendix C

Data

Data Q1
The cost of the dentist
Mostly it is only lazyness that prevents me from going there. Since finishing school i have stop going there regularly and as I had no problems anyway I did not percieve it as a problem to engage in.
I usually visit the dentist every 6 months, unless last time because I forgot oops
I am going once a year to the dentist now because my teeth are very important for me.
I go more often than once a year
uncomfortable feeling, fear
Too little time, too much effort to make an appointment

the dentists' accusations that it's my fault, even though I'm doing the best I can
I am scared what they do will hurt and I'm very afraid of needles. I am also scared they will change what my teeth look like, or be unable to speak because they are working with/in my mouth.
I forgot to make an appointment or I get an appointment too late.
The last years it has mostly been Corona. Otherwise maybe a little bit anxiety about how they might judge you for your teeth.
investing time, taking an appointment
Too lazy as i dont have problems with my teeth.
money
I go twice a year, so this question is not relevant for me
Forgot to make an appointment and moved out of the country for half a year
I'm scared that there is something wrong with my teeth
Nothing like making sure i am healthy
I'm afraid of pain.
Availability of appointments

I think my dental health is good and my dentist always said it too, so I think I am fine not going until something happens
I don't think it's that necessary to have check-ups that often and it's expensive. Furthermore, I've never had any problems so far.
I am going every 6 months.
Does not apply to me. I go every 6 months
the effort of going there
Annoying noises, long waiting time, pain
First of all the distance, since my dentist is in my hometown which is 4 hours away from where i study. Furthermore i think its the fear that something is wrong and i have to pay for it since i didn't go in a while.
Poor time Management
Laziness, Queasiness, Tardiness
During and after COVID I did not make a new appointment until now.
My mother is very afraid of the dentist. We would go when I was younger because she

knew that it was important. When i got braces at 12 we stopped going to the dentist because my mom figured that it would be fine. Ever since then i have never really gotten in the habit of going to the dentist. Now that i am older and pay my own insurance/medical bills it is also just expensive to go to the dentist. I have strong teeth and never really have problems so i figure that i am fine as long as nothing hurts. If i do have a problem (for instance 2 months ago the thread behind my teeth i got after my braces let go)

I have no problem going to the dentist at all. I am not afraid of the dentist at all it is just expensive and i don't really see the urgency right now.

the check ups are painful

since the last time i went is rather long ago, i am afraid i would have to hear accusations of not having been there regularly even though i take care of my dental hygiene.

I go twice per year, but my dentist is an old man who sometimes makes creepy comments which could be a reason people feel uncomfortable to go to check ups.

If I ever not go to the dentist at least once during a year, then it would most probably be because of time management issues or having forgotten it.

I visit my dentist every 6 months for check ups. If I don't stick to this routine, it is usually because I don't have the time.

I go there every 6 months

It's not one of my top priorities as I have yet to have any major problems with my teeth.

Having to call to make an appointment.

Often i think there is no specific need and it's time consuming in cases where something needs to be done. Also the consequences, like pain or medication.

living abroad

Once a year was recommended for me, by my dentist in Germany

Nothing, I visit the dentist at least once a year but mostly twice.

isn't used to check-up regaurly

I don't like to call, so I try to put it off as much as possible.

Fear of calling, I have to call the dentist to make an appointment. And the fear of critique, because I haven't been there in a while and maybe they will think I didn't clean my teeth good enough. I don't like my dentist, she miscounted my wisdom teeth, which was only one, but she counted two.

I forget it

I did in the past, I did not see the dentist for 8 years, it was mostly a mix of depression and not being able to stick to routines due to BPD

i go there every 6 months

Now I started to go regularly again but there was a time when I did not went because I moved to another city and was to afraid of a new dentist

I go to the dentist once every year, I think that is pretty regular.

I go once a year, which is pretty regulary
It just doesn't come to mind to book an appointment since nothing is hurting in my mouth
My dentist was a child dentist and when i turned 18, I could no longer go there, and then I moved away and couldn't find a new dentist.
Time Incentive
being an international student in the Netherlands, so i do not know how the Dutch dentist system works, and can not go home often:((
I sometimes forget that it's already time to have a dental check up
I cannot afford it and I have never been for a preventative check up before, I only go when I have a toothache.
I am going regularly.
Normally there is nothing wrong with my teeth, it is always a checkup where I sit in the chair for 5 minutes and then i can leave, still have to pay like 50 euros. I think it is therefore not necessary to go every 6 months.
There is no need, my teeth don't need to be checked so often since there are okey, and nothing would change in less than a year.
I don't want to sound wrong but the amount of money I have to leave there makes me not want to go there. I live a comfortable life - I work and get enough money to maintain my comfortable living. I can afford most of the dentist appointments, but it gets more and more expensive each time. I actually need to get braces and get my wisdom teeth

removed (because they are causing me pain), but I don't do it because it is very expensive.

I dont have time

Data Q2

Cheaper cost

Having more troubles, and also more knowledge about consequences. I learned that some problems have no direct see-able consequences. More knowledge of why one should go regulary to the dentist might help me to foresee such.

maybe send some more reminders so I dont forget lol. But it may also be helpful for people who dont like to think about the dentist and therefore dont go. If you give them more reminders to make an appointment, they get 'exposed' to their problem and feel a stronger need to go.

a good atmosphere and a good dentist who can calm one self

A (financial) reward from the insurance.

maybe a checklist before going to know what will happen

If they would reach out to me, I often forget that it's time again. Online appointment

Less problems regarding to teeth and helpful tips instead of standard tips

Maybe more knowledge of how to avoid problems within you mouth.

That the dentist does not do anything at the check up but rather tells me what i should prepare myself for next time if they have to do something that is not expected. Also if the dentist knows i don't enjoy going, because they are nicer and more careful that way.

Seeing the urgency.

A friendly dentist.

motivation

the friendly doctor

I have to be less lazy

money

Not really sure, I don't really mind going

my insurance covering it

Knowing that they are not gonna get mad or dissapointed with me

Nice and familiar service

To be encouraged more.

Easier availability and maybe even online booking so I can book quicker and in advance

Only make it easier if it was automatically scheduled as this stops in Germany after the age of 18
For it to be less expensive.
Reminders.
I already feel comfortable -> nothing
fear appeal
If it didn't hurt
more reminders of my dentist
Frequent notifications and fixed appointments. Also having a dentist check up near where i live would make more sense.
mandatory dates or if teh dentist tells me when to come again to have healthy teeth
Someone forcing me to!
Same as I stated in the question before.
Make it less expensive or have it covered by my medical insurance.
the dentist calling me to make an appointment

if the dentists would not always criticise

Nothing

Shorter waiting times.

a friendly dentist

Having the time and money to go.

Not having to call, knowing what they will do beforehand

easier appointment booking and less waiting time

The recommendation to do so

sending reminders

If I could make appointments online without calling them.

ability to make an online appointment

Knowing that I do not have to wait very long for an appointment

Clear communication about what I risk losing with regards to dental health if I do not keep

up with hygienic routines and check-ups, clearly showing how to do certain things
Making a new appointment when I leave the dentist
I go once a year and I never had any issues with my teeth so I think it is fine that way.
I go once a year and I think that is enough, because I never had issues.
To get an appointment for the next check-up from the dentist or to put an reminder for myself to book an appointment at least once a year
more perceived importance; a secretary or parental figure that tells me to go
Finding a dentist which whom i feel more comfortable.
Company
I do not think that I need to go more than twice a year
information about dentist at the Netherlands
if the place is closer to home and something or someone would remind me that it's time to go to the dentist
Cheaper cost for a check up
supportive family and friends
If it was covered by my health insurance, or if it was cheaper.

proper talkthrough before start of work

Having a nice environment to go to, have a nice dentist.

Lower prices.

positive feedback from dentist occasionally going to the dentist and they have to do nothing because everything was fine

That I would have more time

Data Q3

Cheaper cost, the dentist only does necessary procedures and no extra ones.

To be honest I do not know...I am generally not afraid to go there so I do not know anything to reduce such...

I dont know, I just deal with social anxiety in general and dont like when people get close to me, which is why I am not totally relaxed at the dentist, but there isnt much that can be done about that

a nicer dentist would be good.

Nice dentists who inform me about what they are going to do. Dentists who talk to me.

maybe a checklist before going to know what will happen

knowing that I don't need to wait and can get it immediately

Friendly staff and comfortable atmosphere

That the dentist does not do anything at the check up but rather tells me what i should prepare myself for next time if they have to do something that is not expected. Also if dentist knows i don't enjoy going, because they are nicer and more careful that way.

A nice dentist who is empathic.

If they were not as judgemental as they are.

maybe an online appointment system

more friendly environment at the dentist.

I qm comfortable

money

Not really sure, I don't really mind going

Music in the waiting room that I like.

if the cleaning of your gums was less unpleasant

Not getting a lecture about what I do wrong

Knowing the Dentist
I don't really know...
I am comfortable Only make it easier if it was automatically scheduled
Nothing really, I don't stress that much. But if I could be God and do whatever I'd add some cats in the waiting room. Or maybe I wouldn't make waiting rooms too minimalistic and white+white light. Having pastel/toned down colours for interior decoration would make it better, since it takes "the edge" off the environment whilst keeping it classy.
Nothing .
I already feel comfortable
Knowing what they are going to do exactly. Also being informed about what could/will happen when there is something bad or wrong with my teeth
Nothing since I am already comfortable, maybe a bit more fear appeal for what happens if I don't go on a regular basis
knowing that it doesn't hurt and will be uncomfortable in my moth
Different colors in rooms or clothing of doctor, not everything in white. Music. Breaks.
i already feel very comfortable but maybe less waiting time

Knowing that there is no problem with my teeth but thats kinda impossible
if i knew my dentist personally
Less cold lighting, a bit more softer poking around mouth and preferably no drills into my gums (though that one might be impossible)
Generally, I feel comfortable when going to the dentist. This is because I know her well and I know the procedure in general, in other words, I know what to expect.
Make it less expensive or have it covered by my medical insurance.
if it wouldn't hurt
the dentist not saying that i have not been there and just treat me normally
The dentist being female
Knowing that you don't get judged by your dentist would be me relieve.
A nice setting, a friendly and understanding dentist, not too many people in the waiting room
Feeling reassured and informed about what they will do.
No idea
the choice what needs to be done in the moment

nothing, I don't have any problems with dentists

If my dentist would be a little less judgmental and a little better with actual realistic recommendations to get better with my dental care

Knowing I won't be in pain.

I feel comfortable enough for the preventative check-ups.

Knowing that everything is okay

Afternoon appointments, taking someone with me, having good public transport to the dentist to arrive as stress-free as possible,

I just don't like the whole effort of going there, but I generally like my dentist because he appears very modern, young and friendly

Telling myself that everything is going to be fine even if they find something bad

I feel comfortable at my dentist's.

To do it regularly

flavoured toothpaste for adults

That the doctor is nicer and always explains what he is going to do next.

Nothing, I am comfortable going to the dentist

I do not think that there really is anything that could help, because of some health issues I have.

dentists visit to the uni to give some opportunity without any effort for booking

if the place is clean and comfortable

if the dentist explained to me what they were doing during the check up

Calming music, friendly doctor

I do feel comfortable, I have a nice dentist.

Nothing really, but If I need to say something I think it would be nice if we get some kind of treat, just like the kids. This will make me more looking forward for the next one. Also maybe some tips.

Lower prices.

I dont care really.

Data Q4

Numbing medication so I can't feel what the dentist is doing in my mouth.

Like I said, I do not feel anxious before that.

maybe relaxing music
I do not feel uneasy, tense or anxious.
maybe a checklist before going to know what will happen
Maybe a bit smalltalk in advance
Friendly staff, atmosphere and less concerns about my teeth
Taking someone with me I feel comfortable with
That the dentist does not do anything at the check up but rather tells me what i should prepare myself for next time if they have to do something that is not expected. Also if the dentist knows i don't enjoy going, because they are nicer and more careful that way.
Knowing that everything is fine.
Not sure.
never had a problem with dentists, mainly i am too lazy to visit a dentist
I am comfortable. I know my dentist for more than 6 years and she is a good friend of my parents.
i feel okay
Not having to wait very long before my appointment in the waiting area

if the cleaning of your gums was less unpleasant

Knowing that they will fix whatever is wrong without acting dissapointed

Talking through the Procedure

Money.

I dont

Nothing. I am fine with that anxiety because I know that the noise of the machines can't be helped, and after my dental health improves.

I don't feel tense or anxious.

I do feel a bit uneasy with the instruments, since I don't know exactly what machine does what. So, for me it would really help if the dentist explains what they are doing before doing it. Like this "so, now we are doing this... with this machine... and you are going to feel this...". This way, I am more prepared

More explanation about what the dentist will do

Knowing what they are going to do exactly. Also being informed about what could/will happen when there is something bad or wrong with my teeth

Telling myself that I will eventually get out of the situation

that everything will be fine and my teeth are well

Nothing :(

If i would do it regularly i think this fear would automatically fade away if my previous visits were alright

a talk with the staff on the phone when making an appointment and she tells me to be calm and what the exact procedure will be

Someone forcing me to!

knowing what exactly is about to happen and how it might make me feel

Maybe a tool or something that stimulates me to brush my teeth more (properly). If you have 'good' teeth, there is nothing to fear, right?

Some dentists have the set up where all the chambers are connected at the back by a hallway this way you can hear whatever is going on in the other rooms, this sucks.

less noise from the tools

the knowledge that i will not hear accusations or be criticised

The dentist being female, so I know for sure she won't make any weird comments

enlightenment Concerning the treatment

Going there regularly so the "damage" is not that big that it hurts too bad Knowing that the

dentist will stop if it gets too uncomfortable No pressure that a treatment has to be done
I'm not sure.
Someone going with me
i think nothing except for taking better care of my teeth, as the anxiety stems from the experience of pain and uncomfortability when something needs to be done
The dentist explaining in detail to me, what exactly they are going to do
Knowing I won't be in pain.
not having the dentist tools being prepared in front of me
I would use some breathing exercises.
talking to the assistant/dentist
Knowing that everything is fine
The dentist talking about anxiety and fear and patients, how it is normal, how they will not judge it, how they are happy to cooperate and take me into consideration, to develop a sign to stop when panic gets too crazy
i don't feel uneasy, tense or anxious
Talking to someone about it

I do not feel uneasy and that is why I go regularly.
Not experiencing feelings of uneasy, tense or anxious when going to dentist
Knowing in advance what exactly the dentist is going to do.
Assurance that it will be fine
I do not think that there really is anything that could help, because of some health issues I have.
after going to the dentist, I can get a treat from them.
Telling myself that this is temporary
Taking a break or feeling assured by my dentist that they will listen to me and my feelings
Not relevant.
-when the dentist would take his time and not just start working right away
Tell myself that it will only be a moment and that it will help you in the future
It depends on how nurses and dentists treat you. So far I had only one unpleasant experience with the dentist, but it was easier when I changed clinics.
kind dentist and workers they have to be polite

I dont feel this way

Appendix D

Code Frequencies Related to Anxiety Scores

Code	4-8	9-12	13-14	15-20
Dental Staff – Patient - Relationship	7	8	7	2
Miscellaneous	23	9	4	0
Information	10	4	6	2
Fear & Pain	4	7	6	2
Perceived Need for Dental Checkups	12	4	2	1
Cost	6	4	3	0
Availability	8	4	5	0
Environment	5	5	3	0
Appointment System	5	3	2	2
Forgetfulness & Reminders	7	4	2	0
Social Support	3	2	3	1
Lack of Time	7	2	0	1
Fewer Dental Concerns	2	2	4	1
Control	0	2	3	2
Routines	3	4	2	0
Other Illnesses and Disorders	0	1	2	0

Self-Soothing	4	1	0	0
Techniques				
Covid Pandemic	1	1	0	0