Dental fear in children: prevalence, etiology and risk factors

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CHAPTER 1

GENERAL INTRODUCTION
Introduction
Clinical fears, or specific phobias, are among the most commonly diagnosed anxiety disorders in children, next to generalised anxiety disorders and separation anxiety disorders (Costello & Angold, 1995). Most age-appropriate fears are transitory in nature, such as fear reactions to strangers, separation from parents or loud noises during transition from infancy to childhood. Increased ego strength and the development of cognitive abilities usually provide children with the proper coping capacities to learn to adequately deal with these fears. For some children, however, their fear reaction is maladaptive causing fear to persist for a longer period of time, or even into adulthood. Common examples of these clinical fears are excessive fear of animals, heights and water, but also of medical and dental procedures (King, Eleonora & Ollendick, 1998). While these clinical fears or phobias may all interfere with normal or effective functioning to some degree, the latter may also have negative consequences for one’s health.

This thesis is therefore focused on this specific childhood fear: dental fear. Dental fear is a widespread phenomenon considered as a serious problem in many countries. Its etiology is complex and multifactorial; not only can various aspects be distinguished within this construct, also different factors are involved in the acquisition and development of dental fear in children. Dental fear in children does not only concern fear of pain or of invasive procedures, but also entails separation from the parents, confrontation with unfamiliar people and surroundings, and the experience of loss of control. Closely related are potential etiological factors such as painful experiences, parental fear or a child’s temperament (Klingberg, Berggren, Carlsson & Norén, 1995a; Liddell, 1990; Milgrom, Mancl, King & Weinstein, 1995a; Townend, Dimigen & Fung, 2000). These factors and their potential role in the etiological process are the focus of this thesis and will be discussed extensively in the next chapters. Prevalence estimates of childhood dental fear vary greatly, from 3% even up to 43% (e.g., Bedi, Sutcliffe, Donnan & McConnachie, 1992; Gatchel, 1989; Holst & Crossner, 1987; Milgrom, Vignesha & Weinstein, 1992; Teo, Foong, Lui & Elliot, 1990; see also Table 1). This variety in prevalence reports is due to numerous differences in methods and study populations used in research, which seems to have been an important drawback of child dental research. Measurement instruments vary from behavioural ratings and self-report questionnaires to parental ratings or questionnaires. As a consequence, results are often incomparable. Some prevalence reports may essentially concern behavioural management problems, since dental fear and uncooperative behaviour often have been considered as similar phenomena in children.
Table 1. Prevalence reports and mean scores of studies using the CFSS-DS.

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>Country</th>
<th>N</th>
<th>age</th>
<th>sample</th>
<th>assessment</th>
<th>mean (SD)</th>
<th>cut-off (range 15-75)</th>
<th>%</th>
<th>differences gender age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuthbert &amp; Melamed, 1982</td>
<td>USA</td>
<td>603</td>
<td>5-14</td>
<td>schools</td>
<td>self-report</td>
<td>28.7 (--), --</td>
<td>--</td>
<td>x</td>
<td>y&gt;o</td>
</tr>
<tr>
<td>Chellappah et al., 1990</td>
<td>Singapore</td>
<td>505</td>
<td>10-14</td>
<td>schools</td>
<td>self-report</td>
<td>30.6 (10.8), ≥42</td>
<td>17.7</td>
<td>g&gt;b</td>
<td>--</td>
</tr>
<tr>
<td>Alvesalo et al., 1993</td>
<td>Finland</td>
<td>828</td>
<td>13</td>
<td>schools</td>
<td>self-report</td>
<td>22.1 (6.4), parental rating</td>
<td>21.0</td>
<td>g&gt;b</td>
<td>x</td>
</tr>
<tr>
<td>Milgrom et al., 1994</td>
<td>Canadian Chinese People China Rep.</td>
<td>70</td>
<td>5-15</td>
<td>dental program, dental practice</td>
<td>parents' version</td>
<td>31.9 (9.5), ≥38</td>
<td>21.4</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99</td>
<td>2.5-7</td>
<td>pediatric dentistry department</td>
<td>parents' version</td>
<td>35.7 (8.9), ≥38</td>
<td>43.4</td>
<td>g&gt;b</td>
<td>x</td>
</tr>
<tr>
<td>Klingberg et al., 1994</td>
<td>Sweden</td>
<td>3204</td>
<td>4-6, 9-11</td>
<td>dental clinics</td>
<td>parents' version</td>
<td>23.1 (8.1), ≥38</td>
<td>6.7</td>
<td>y: x</td>
<td>y&gt;o</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b: 31.1 (10.3), &gt;40</td>
<td>19.5</td>
<td>g&gt;b</td>
<td>y&gt;o</td>
</tr>
</tbody>
</table>

---: no report
x: no relation
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At this point, it is therefore important to note that although in pediatric dentistry dental fear and behavioural management problems share great overlap they may possibly need to be regarded as distinct problems (Klingberg et al., 1995a; Klingberg, Sillén & Norén, 1999). Furthermore, with respect to variety in prevalence estimates, study samples are often highly selective, including only a specific cultural group or children in a limited age range. To illustrate, Table 1 provides an overview of prevalence reports with the same instrument used in several recent studies: the Dental Subscale of the Children's Fear Survey Schedule (CFSS-DS; Cuthbert & Melamed, 1982), specifically developed to assess dental fear in children. Even when using the same instrument, as shown in the Table, a normative study among a large, representative Swedish urban sample indicated 7% of the child population to be fearful, while a study among American low-income children reported about 20% of the children to be fearful (Klingberg, Berggren & Norén, 1994b; Milgram et al., 1995a). It is demonstrated by these prevalence reports as well as by the mean fear scores, that not only age, but also cultural aspects are involved. A need for specific normative data and cut-off scores for different countries and specific subgroups is thus indicated. So far, in the Netherlands no extensive normative studies among children have been conducted, while of the adult population about 22% has been estimated to be highly anxious, and 4% was even considered phobic (Stouthard & Hoogstraten, 1990).

In children dental fear often is the main reason of behavioural management problems, of interference with regular treatment and of subsequent referral to centres for special dental care. Other negative consequences of dental fear include avoidance of the dental situation and subsequently deterioration of oral health. This eventually may start a vicious circle of avoidance, creating feelings of shame, guilt and inferiority, further maintaining this negative spiral by reinforcing one’s fear and avoidance behaviour (Berggren, 1984). More information is needed on the nature and origins of dental fear to prevent children from developing this high dental fear, but also to be able to provide fearful children with the most effective treatment strategy. That is, several pathways of fear acquisition in children have been proposed and treatment strategies may need to be adjusted to the predominant pathway in order to render treatment most effective (Rachman, 1977, 1978). Several factors have repeatedly been associated with child dental fear, while their relative contribution in the acquisition and maintenance of dental fear still remains to be determined, partly due to great variety in methodology and study populations used. The aim of this thesis therefore is to study the etiology of dental fear, by identifying its determinants and by examining their role in the acquisition and development of dental fear. First an adequate instrument is needed to
be able to study dental fear in children. Therefore, an overview of assessment techniques is given below, and reasons for choosing the instrument (CFSS-DS) used in this thesis are discussed. Next, the aims and structure of this thesis are presented. Firstly, the terminology often used in research will be discussed.

**Fear, anxiety or phobia?**

The terms dental fear, phobia and anxiety are often used interchangeably and synonymously in literature, particularly in the field of child research. Although these concepts are interconnected, conceptual differences can be distinguished (Benjamins, 1995; Milgrom, Weinstein & Getz, 1995b). Traditionally, fear is differentiated from anxiety with respect to the presence of a specific external threat. That is, anxiety refers to an aversive emotional state without a specific focus or stimulus, while fear does refer to a reaction to such a stimulus. Fears and phobias on the other hand, are differentiated based on their duration or intensity. Fears are often mild, age-specific and transitory in nature, while a phobia is described as a persistent, extreme form of fear. To illustrate, Box 1 shows the criteria of specific phobia as specified by the DSM-IV (APA, 1994).

**Box 1.** Criteria for specific phobia according to the DSM-IV criteria (APA, 1994, p. 203-205).

- a) marked and persistent fear that is excessive or unreasonable, cued by the presence or anticipation of a specific object or situation; 
  - b) exposure to the phobic stimulus almost invariably provokes an immediate anxiety response, which may take the form of a situationally predisposed Panic Attack; 
  - c) the person recognises that the fear is excessive or unreasonable; 
  - d) the phobic situation(s) is avoided or else endured with intense anxiety or distress; 
  - e) the avoidance, anxious anticipation, or distress in the feared situation(s) interferes significantly with the person’s normal routine, occupational (or academic) functioning, or social activities or relationships, or there is marked distress about having the phobia; 
  - f) in individuals under 18 years, the duration is at least 6 months and 
  - g) the anxiety, Panic Attacks or phobic avoidance with the specific object or situation are not better accounted for by another mental disorder such as Obsessive-Compulsive Disorder, Post-traumatic Stress Disorder, Separation Anxiety Disorder, Social Phobia, Panic Disorder With Agoraphobia, or Agoraphobia Without History of Panic Disorder.

The DSM-IV notes that children may not recognise their fears as excessive or unreasonable and that phobias may be expressed in childhood ways such as crying, tantrums, freezing or clinging. Obviously, the distinction between fear, anxiety and phobia is not always clear in the sense of the actual presence of a threat, its duration or concomitant fears. Its most important feature, however, is the risk of interference with normal or effective functioning, regardless of terminology used. When referring to a child’s negative, fearful or sometimes
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even phobic reactions to and perceptions of dental treatment in this thesis, for the most part
the term fear is used, although occasionally also the terms anxiety and phobia are used
interchangeably. Dental fear is thus regarded as a situation-specific though relatively stable
fear in children, involving a broader concept than just state anxiety during a specific dental
visit (Stouthard, 1989). The preference of the term fear over anxiety and phobia in the present
thesis was mostly based on practical grounds. In most recent studies this term was used and,
more important, the instrument used in this thesis is the Dental Subscale of the Children’s
Fear Survey Schedule (CFSS-DS).

Assessment

Many measurement techniques have been proposed and used to assess dental fear in
children, ranging from (self-report) questionnaires and projective techniques to behavioural
and physiological registrations\(^1\). Most of these instruments, however, entail serious
disadvantages often related to developmental changes in children. Projective techniques (e.g.,
Children’s Dental Fear Picture test (CDFP), Klingberg & Hwang, 1994c) and physiological
registrations (e.g., heart rate, skin conductance) may provide specific individual information,
but are methodologically and practically difficult to use and process. For example, specific
test situations and equipment may be needed for such measurements, and test
administration may be time consuming or anxiety provoking. In addition, it has been
suggested that age and individual differences may influence the validity or efficacy of such
registrations (Bastawi, Reid & West, 1979; Benjamins, 1995; Klingberg, 1995). As to the
behavioural registrations (e.g., Frankl’s Rating Scale; Frankl, Shiere & Fogels, 1962; Melamed’s
Behavior Profile Rating Scale (BPRS), Melamed, Weinstein, Hawes & Katin-Borland, 1975;
see Hosey & Blinkhorn, 1995), although these are easier to administer, also an important
disadvantage is involved. That is, behaviour concerns more or other aspects than just dental
fear and may be seen as the combined outcome of a child’s dental fear, its temperament and
its coping abilities (Veerkamp, 1994). Behavioural registrations thus do not discriminate
between actual fear and behavioural management problems. Not all children suffering from
dental fear show behavioural management problems, while on the other hand, not all
children displaying behavioural management problems have to be dentally fearful
(Klingberg et al., 1995a). For example, in certain instances behaviour management problems
may essentially be a manifestation of a child’s young age and its lack of capacities to
understand and accept dental treatment, while having no actual relation to dental fear. With
increasing child age, fear and behaviour may begin to diverge more as children learn to

\(^1\) see for earlier overviews Veerkamp (1994) and Klingberg (1995)

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control the way they express fears as they grow older. Thus for younger children, behavioural measures may provide a reasonable reflection of the child's dental fear, while this relation may get more clouded for older children. A review on these behavioural measurements techniques suggested Melamed's BPRS (1975) to be preferred over other behavioural measures, although it was concluded that behavioural measures may not be the best option for assessing dental fear (Aartman, Van Everdingen, Hoogstraten & Schuurs, 1996). Another option is using (self-report) questionnaires (e.g., CFSS-DS, Cuthbert & Melamed, 1982; Dental Anxiety Scale (DAS), Corah, 1969). Questionnaires are, as opposed to some of the techniques discussed above, easy to administer and to process statistically. Also, extensive use of questionnaires in international research often provides normative data enabling for example cross-cultural comparisons. A disadvantage of using self-report questionnaires among children is that children have to be old enough to be able to complete the questionnaire themselves, which often is impossible for younger children. Adjusting the questionnaire for completion by the parents can solve this problem, an adjustment often made in child psychology and we may add, in the present thesis.

In conclusion, the use of questionnaires is preferred over the other measures, considering the aim of this thesis. Dental fear is a highly subjective experience and therefore involves a lack of objective definition or gold standard, so all assessment instruments will entail disadvantages. Fear questionnaires seem to best approach this gold standard and in our view are to be preferred over behavioural registrations, taking into account that this thesis focuses specifically on dental fear and not on associated problems such as behavioural management problems. In addition, compared with physiological or projective techniques the use of questionnaires involves practical advantages with respect to the collection of data for large samples of children. In a review of self-report measurements the CFSS-DS was preferred over the Venham Picture Test (VPT, Venham, Bengston & Cipes, 1977) and Corah's Dental Anxiety Scale for children (DAS, 1969) (Aartman, Van Everdingen, Hoogstraten & Schuurs, 1998). Furthermore, the CFSS-DS was originally developed for assessment of dental fear in children, as opposed to the DAS. Also, the CFSS-DS has been widely used in extensive studies on child dental fear and reports on its reliability and validity are promising (Alvesalo, Murtomaa, Milgrom, Honkanen, Karjalainen & Tay, 1993; Cuthbert & Melamed, 1982; Klingberg, 1994a; Klingberg, Vannas Löfqvist & Hwang, 1995b; Milgrom, Jie, Yang & Tay, 1994). Normative data and cut-off scores have been provided for several countries, enabling comparisons between different study populations and cultures (see Table 1). In several of the studies a parental version of the questionnaire has been used, and it was
shown that parents are well able to assess their child’s dental fear (Klingberg et al., 1994b: Milgrom et al., 1994). Based on these reports, the available psychometric data, its extensive use in international studies and the aims of this thesis, it was decided to develop and use a Dutch parental version of the CFSS-DS.

Aims and thesis structure

The main objective of this thesis is to study the etiology of high dental fear in children, by identifying its determinants and by subsequently examining their role in the acquisition and development of dental fear. First an adequate and reliable instrument for assessing this dental fear in children is needed, to enable this concept to be studied. Therefore, the first aim of this study is to examine and to evaluate the CFSS-DS, the instrument selected as main assessment tool in this thesis and secondly, to provide normative data and to report on the prevalence of (high) dental fear in the Netherlands by using this instrument.

The structure of this thesis is as follows. Chapter 2 offers an overview of research on the etiology of childhood dental fear, which can be roughly divided into the contribution of direct and indirect conditioning experiences and personality variables. In chapter 3 the psychometric properties and clinical relevance of the Dental Subscale of the Children’s Fear Survey Schedule are studied, the instrument used to assess dental fear in children in this thesis. The reliability and factor structure of the scale is examined for a group of low fearful children (part 1), as well as for a group of high fearful children (part 2). Part 3 of this chapter does assess the validity and clinical utility of the CFSS-DS by relating it to another measure of dental fear, i.e., a dentist's rating of the child’s dental fear during treatment. In the next chapter (4), the CFSS-DS is used to describe the prevalence of child dental fear in the Netherlands and to establish Dutch normative data and cut-off scores. Having established these normative data, in the next chapters the CFSS-DS is used as a device to further study the etiology of dental fear in children.

In chapter 5 parental beliefs on the origins and prevention of childhood dental are examined by interviewing parents of high fearful and of low fearful children. In the next chapters the potential role of several factors, reported to be important by these parents as well as in previous research, in the acquisition and development of dental fear will be studied and described more extensively. These factors involve social influences, temperamental characteristics and dental experiences. First, in chapter 6 the influence of social factors, or indirect conditioning experiences, is studied; i.e., the relation of child dental fear with parental dental fear and parental child rearing behaviour is assessed. In chapter 7, consisting of two parts, the relation of child dental fear and temperamental or personality
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factors is examined. In the first part, an inventory of concomitant behavioural and emotional problems in fearful children is made, and subsequently in part 2 the potential influence of these problems on the children's further fear development is examined more closely. Chapter 8 focuses on the (predictive) role of direct conditioning experiences in children's fear acquisition, by examining children's complete dental history preceding the assessment of their fear. Finally, in chapter 9 the relation between child dental fear and dentists' behaviour is assessed and evaluated. In the chapter 10 the findings reported in the preceding chapters will be summarised and reviewed, and conclusions and clinical implications will be discussed.

Given that most chapters are based on separate publications inevitably some overlap between the chapters does exist, for which we apologize. It should also be noted that terminology used in chapters varies due to different journal requirements. In addition, the chapters in this thesis are not arranged entirely chronologically for editorial reasons.
Chapter 1

References


Chapter 1


