Toothbrushing is not a 'mindless habit': it is part of a young person's lifestyle.

Ian Macgregor, John Balding & David Regis

Young people and toothbrushing: when and why?

Why do young people differ in their toothbrushing regimes? Numerous surveys have studied the 'bare facts' about toothbrushing (frequency, and links with dental health), but very little is known about the psychology of personal dental care, and whether greater awareness of why young people brush their teeth as they do could assist dental health care professionals in their work.

The sample

The report summarised in this article describes the results of a questionnaire survey of toothbrushing behaviour and other health-related behaviours in 7,770 young people aged 14-15 years, conducted in 1990. Males and females were equally distributed within the sample. The data was obtained from the individual surveys carried out during that year by 131 secondary schools in England that used the Unit's Health-Related Behaviour Questionnaire. This questionnaire, developed by John Balding, is used by schools wishing to obtain information about 'lifestyle' profiles of their pupils in order to support health education. The processed data, returned to the respective schools, makes for more effective and relevant curriculum planning.

Table 1. Percentage distribution of toothbrushing frequency in boys and girls aged 14-15.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Male</th>
<th>Female</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>0.0</td>
<td>0.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Once</td>
<td>2.0</td>
<td>13.1</td>
<td>19.4</td>
</tr>
<tr>
<td>Twice</td>
<td>65.0</td>
<td>69.4</td>
<td>67.2</td>
</tr>
<tr>
<td>3 or more</td>
<td>7.5</td>
<td>17.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Sample</td>
<td>3758</td>
<td>3652</td>
<td>7410</td>
</tr>
</tbody>
</table>

The questionnaire covers a wide range of social, behavioural and lifestyle variables. In this article, we briefly examine some aspects of dental health with respect to other variables present in the data.

The questions

There are four principal aspects of dental health recorded in the questionnaire:

Frequency: How many times did they brush their teeth yesterday (0, 1, 2, 3+?)

Schedule: When did they brush their teeth yesterday (before or after breakfast, before bed)?

Motivation: a what was their main reason for brushing their teeth (avoid food, sweep, teeth look nice, make mouth feel clean)?

Dentistry: When did they last visit the dentist, and what happened (visit, advice on brushing, check-up only)?

Gender differences

There is a marked gender difference in brushing frequency, females brushing much more frequently than males (Table 1). There are also more males than females in the once-a-day brushing group. Table 2, under 'motivation', shows the gender differences: males are motivated more by good appearance and avoidance of bad breath, females more by the need for the mouth to feel clean.

Once or twice a day?

We can immediately see from Table 1 that there are more males than females in the once-a-day group. Once a day is considered inadequate to avoid the build-up of plaque, and so the advice to the once-a-day brushers must be to brush once again.

Table 2. The percentage of young people within each of the four toothbrushing schedules that recorded different daily frequencies and motivations for toothbrushing.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Males Brushing schedule</th>
<th>Females Brushing schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before b/last</td>
<td>After b/last</td>
</tr>
<tr>
<td>Once</td>
<td>21.0</td>
<td>18.8</td>
</tr>
<tr>
<td>Twice</td>
<td>65.3</td>
<td>70.9</td>
</tr>
<tr>
<td>Three or</td>
<td>13.6</td>
<td>10.3</td>
</tr>
<tr>
<td>Sample</td>
<td>1270</td>
<td>2276</td>
</tr>
</tbody>
</table>

Table 3. Interconnections between dental health data. (m = males only; 1 & 2 refer to brushing once or twice a day)

Frequency Schedule Motivation

<table>
<thead>
<tr>
<th></th>
<th>Before b/last</th>
<th>After b/last</th>
<th>During</th>
<th>Before bed</th>
<th>After bed</th>
<th>During</th>
<th>Before b/last</th>
<th>After b/last</th>
<th>During</th>
<th>After bed</th>
<th>During</th>
<th>Before b/last</th>
<th>After b/last</th>
<th>During</th>
<th>After bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filling</td>
<td>Brush less often</td>
<td>Brush more often</td>
<td>Complete care</td>
<td>Brush less often</td>
<td>Brush more often</td>
<td>Complete care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Brush before breakfast</td>
<td>Brush after breakfast</td>
<td></td>
<td>Brush before breakfast</td>
<td>Brush after breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Brush less often</td>
<td>Brush more often</td>
<td>Complete care</td>
<td>Brush less often</td>
<td>Brush more often</td>
<td>Complete care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>Brush before breakfast</td>
<td>Brush after breakfast</td>
<td></td>
<td>Brush before breakfast</td>
<td>Brush after breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>Brush for mouth to feel clean</td>
<td>Brush to look nice</td>
<td></td>
<td>Brush for mouth to feel clean</td>
<td>Brush to look nice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>All Males</td>
<td>All Females</td>
<td>All</td>
<td>All Males</td>
<td>All Females</td>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tooth brushing may be tempting to say "Teeth feel good after a good visit to the dentist, but the link shown in Table 3 does not necessarily mean that the lack of tooth brushing was the direct or indirect cause of the need for fillings. X is associated with Y does not necessarily mean X leads to Y.

To illustrate this point, consider the following scenario. Suppose that despite regular brushing, some of the young people in the sample had fillings on their last visit. If their main reason for brushing was dental rather than cosmetic, they might become disillusioned and begin to brush less often. In this case, it would not follow that tooth brushing frequency had any effect on the likelihood of fillings — in fact, the fillings would have had an effect on the tooth brushing! The reader may be able to think of other more likely explanations to make the same point.

In addition to this possible reversal of cause and effect between two linked variables, the complex nature of cause and effect in human affairs must always be borne in mind. Research into Health Related Behaviour Questionnaire data.

Dental links

There are many associations between the dental health variables, as shown in Table 3. There is too much here to comment on individually, but an example will show how the analysis should be approached.

From the first column we discover that those who brush less often are more likely to have had fillings on their last visit to the dentist. Parents of children that are causally about their tooth brushing may be tempted to say "Teeth feel good after a good visit to the dentist, but the link shown in Table 3 does not necessarily mean that the lack of tooth brushing was the direct or indirect cause of the need for fillings. X is associated with Y does not necessarily mean X leads to Y. To illustrate this point, consider the following scenario. Suppose that despite regular brushing, some of the young people in the sample had fillings on their last visit. If their main reason for brushing was dental rather than cosmetic, they might become disillusioned and begin to brush less often. In this case, it would not follow that tooth brushing frequency had any effect on the likelihood of fillings — in fact, the fillings would have had an effect on the tooth brushing! The reader may be able to think of other more likely explanations to make the same point.

In addition to this possible reversal of cause and effect between linked variables, the complex nature of cause and effect in human affairs must always be borne in mind. Research into Health Related Behaviour Questionnaire data.
The following topics in the Health Related Behaviour Questionnaire were examined for links with dental health data:

- Sex (male, female)
- Region of country (Northern, Southern)
- Newspapers available at home (broadsheets, tabloids)
- Time of getting up (early, late)
- Time of going to bed (early, late)
- Neighbourhood (town, country)
- Parents at home (both parents, single parent)
- Family size (1, 2-3, 4+)
- Birth order (first child, later birth order)
- Dating (current boyfriend/girlfriend)
- Sports Involvement (score of 15+ on aggregate sport measure)
- Breakfast (nothing/drink, more solid food)
- Smoking (non-smoker, wants to give up, committed smoker)

Table 4. Connections between dental questions and other topics. (M = males only; F = females only; 1 & 2 refer to brushing once or twice a day)

which records a very wide range of behaviours, has uncovered numerous statistically significant links between them. However, so many factors operate within the complex web of human behaviour that these individual "markers" are just single items in clusters of linked behaviours. In the present example, it is impossible to consider frequency of toothbrushing in isolation. Toothbrushing techniques, available facilities, parental control, reasons for brushing, and of course dietary factors, may all contribute to the relationship between frequency of brushing and reported dental treatment.

Only connect...

We also looked for connections between responses to these dental questions and other topics in the databases (Table 4). There are over 400 to choose from, from which we picked the ones shown in the accompanying box.

We composed tables such as Table 5 and ran a statistical test on the figures to see if any differences we saw were "statistically significant", that is, probably not just due to chance. All differences referred to below were statistically significant on testing.

More detail of these variables, and how the tables were composed, is available in the report.

Table 5. Toothbrushing and newspaper readership group: an example of the data compiled for each of the variables listed on the opposite page.

Three of these variables need further comment:

- Region: we divided the country conventionally between North and South, by drawing a line between the River Severn and the Wash. Perhaps a better description would be "North and Midlands" and "South".

Newspaper readership group: subjects were asked to report national daily newspapers that were regularity in the home, and were categorised according to readership of broadsheets (I), tabloids (II) or popular tabloids (III). There are some associations between newspapers read and socio-economic groups (2). Table 5 shows dental data by newspaper readership group.

Sporadic Index: the Health Related Behaviour Questionnaire offers respondents a list of sporting activities such as rugby, squash and swimming, and asks the pupils to state for each sport the frequency of the activity. A score is given to each pupil, at least once a month being recorded a score of 1, once a week scoring 2, and more than once a week scoring 3 (Table 6). Sedentary sports on the list, for example pool and darts, are excluded. "Thirteen points or more qualifies a person as "sporty".

Vol. 11 No. 5, 1994

Education and Health 75

Previous research

Data collected by the Unit over the last five years or so has led to the identification of several social and personality variables that seem highly associated with toothbrushing frequency as well as other health-related behaviours. Summarising, young people who brush their teeth more often tend to be characterised by:

- 1. Higher self-esteem
- 2. A feeling of being more in control of their own health
- 3. Greater confidence with members of the opposite sex
- 4. Pay more attention to other hygiene practices (e.g. have more baths a week)
- 5. Belong to the "quality" newspaper readership group (3)

One of the authors (David Regis) has for a long time been interested in the notion of perceived control over personal health (health locus of control), believing it to be a potentially powerful filter of health education messages. The second association in this list suggests that people who feel in control of their health (intentional health locus) brush their teeth more often than those who do not feel in control of their health (external locus).

How often and why?

We observed systematic differences in motivation for toothbrushing, although contradictory tendencies appear where we attempt to generalise about particular reasons for toothbrushing. The placing of toothbrushing during the daily schedule, whether performed once, twice, or more frequently, far from being a "mindless habit" as is popularly believed, does appear to be consistent with the most salient reasons for toothbrushing seen by these young people.

In general, better toothbrushing practices are associated with Southernners, broadsheet newspaper readers, and town dwellers.

Those having a more confident and positive outlook on life as measured by their self-esteem and a feeling of control over their health, and in more diligent brushers, seem to judge that the mouth feel clean that is, for a social or cosmetic reason rather than particularly for dental care.

Northerners, readers of popular tabloids and...
Table 6. Toothbrushing and sporting activity index: another example of the data compiled for each of the variables listed on page 74.

<table>
<thead>
<tr>
<th>Males</th>
<th>Sporting activity index</th>
<th>Females</th>
<th>Sporting activity index</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1–6</td>
<td>0</td>
<td>1–6</td>
</tr>
<tr>
<td></td>
<td>7–12</td>
<td>13+</td>
<td>7–12</td>
</tr>
</tbody>
</table>

Frequency

- Once: 35.5, 30.5, 22.5, 20.4
- Twice: 58.6, 63.4, 69.1, 68.9
- Three or more: 5.9, 6.1, 8.4, 12.6
- Sample: 338, 1918, 1003, 499

Motivation

- Teeth to look nice: 18.2, 17.5, 18.3, 22.6
- Avoid false teeth: 10.6, 9.9, 10.2, 8.1
- Like fresh breath: 12.6, 12.1, 11.3, 12.5
- Avoid toothache: 25.9, 30.7, 25.5, 22.8
- Mouth feels clean: 28.7, 30.0, 34.7, 34.0
- Sample: 341, 1808, 939, 456

the growing belief that soft drugs are not harmful needs to be attacked.

Viewpoint

Mary Brett: Hard facts about soft drugs

I have been teaching biology at a secondary school in the Home Counties for 20 years, and am responsible for the health education programme. I am also a teacher governor of the school. Being aware that many youngsters in this region are tempted by soft drugs, I have for a long time taken an interest in this problem, and have read widely on the subject.

The joint Addiction Research Foundation/World Health Organisation (ARF/WHO) Report published in 1981 (1), which is the subject of this contribution, remains, despite its date of publication, one of the most important sources of information and views on the effects of cannabis use. I believe very strongly that it is worthy of much wider publicity, especially since much of its content has been overlooked in such semi-official publications as the Inquiries into the effects of drugs available to teachers and in doctors' surgeries. It is very important that everyone is made fully aware of the dangers of soft drugs: the complacency and growing belief that soft drugs are not harmful needs to be attacked.

Understating the dangers

We now know from recent surveys that many schoolchildren and students use marijuana recreationally with no thought that it could be doing them any permanent damage. This is not surprising, since leaflets available to health centres, and many articles in the press, indicate that apart from lung damage from the smoke (as if that were not enough) there is little evidence of any long-term effects on health.

This is not true, and I have challenged the Institute for the Study of Drug Dependence (ISDD) upon the inadequacies of their marijuana facts sheet (2) which is distributed to schools to inform teachers. The ISDD fact sheet is based primarily on the ARF/WHO report, which deals with the adverse health and behavioural consequences of cannabis use. As correctly pointed out by the ISDD there have been no large-scale epidemiological studies of cannabis use, but there is ample evidence, quoted in the ARF/WHO report, to set alarm bells ringing.

Many experiments have been done on animals, and those done on primates, especially, give clear indications of effects that can be expected on human subjects. Why do we bother with animal experiments if the results are going to be ignored?

Psychiatric effects

The psychoactive ingredient in cannabis is THC (tetrahydrocannabinol). This compound is fat-soluble, and as such will accumulate in fatty tissues of the body, to be released into the bloodstream over a period of 5–8 days. The effects of THC are thus prolonged. Smoking only once or twice a week will ensure a permanent source of THC in the body, unlike alcohol, which is broken down in the liver at a rate of about one unit per hour. Some adverse psychiatric effects, lasting from a few days to several weeks, have been known since the turn of the century, when the therapeutic use of cannabis extract was common and side-effects were frequently described in the clinical literature (3).

We read in the report: The animal studies, which revealed long-lasting impairment of learning ability after a period of chronic cannabis treatment, raise the clear possibility that residual long-lasting brain damage can be caused by cannabis. The study reports that testosterone levels and sperm numbers are reduced in experimental rats and mice after administration of cannabinoids. This is substantiated in human subjects by a report from Kingston Hospital in Jamaica that 20% of males that had smoked marijuana for five years or more complained of impotence; and in another survey of 500 men between the ages of 18 and 30, many had significantly lowered sexual activity after 6–7 years of smoking.

The immune system also appears to be adversely affected. There is consistent evidence from mouse studies that doses of THC and pot, lower than those that alter behaviour, induce immunological defects. Several researchers have found damage to various components of the immune system in human subjects, and some cases of dormant genital herpes seem to have been reactivated after pot smoking.

Do children listen?

Respiratory and pulmonary toxicity have emerged as major clinical complications of chronic cannabis smoking, says the report. Marijuana smoke has been shown to cause chromosome aberrations in experimental animals.