Psychological Factors and Oral Health Practice

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1. Intro - Why Psychology?
2. What determines individual health behaviour?
3. What determines health professionals’ and caregiver behaviour?
4. Some Conclusions
“...daily flossing is highly recommended.” (ADA)
Why Psychology?

• All patient activities are behaviour:
  – Brush teeth regularly
  – Apply fluoride gel on a weekly basis
  – Floss
  – Make appointment with dentist / hygienist
  – Follow specific diet
  – ...

• Psychology as science of human behaviour can help understanding patient engagement (or non-engagement)
Why Psychology?

• Oral health also depends on others’ behaviour
  – Adherence to treatment guidelines is individual behaviour
  – Adherence to recommendations for best oral health practice is individual behaviour

• Psychological models of behaviour can be applied to understand and modify oral health professionals’ behaviour
Efficacy / Effectiveness: Behaviour

**Efficacy**
- A: 20% Caries Risk Reduction
- B: 30% Caries Risk Reduction

**Effectiveness**
- 50% Compliance → 10% Risk Reduction
- 25% Compliance → 7.5% Risk Reduction
What determines individual health behaviour?

- Rewards / Operant conditioning
- Common-sense model of health and illness
- Motivation and action components of changing behaviour
Rewards and behaviour
Operant Conditioning

Add positive stimulus: Positive Reinforcement

Remove negative stimulus: Negative Reinforcement

Add negative stimulus: Positive Punishment

Remove Positive stimulus: Negative Punishment

Increase Behavior

Decrease Behavior
Conditioning: Stimulus value matters
Reward schemes: Tokens
Reward schemes: Tokens

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
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<th>Saturday</th>
<th>Sunday</th>
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EXCHANGE RATE:
14 Smileys: Rent and Watch DVD with Mom and Dad
28 Smileys: Go to Cinema with Mom and Dad
Self-rewards and concrete tokens

• Self-rewards: Arrange a contract with yourself
• Works well with interdental hygiene (O’Neill et al., 1987)
Reward Effects

- Group 1: BASS demonstration floss demonstration
- Group 2: Additional plaque coloring with feedback
- Group 3: Additional praise from dentist
- Group 4: Additional list of tasks to tick off

FMPS: Full Mouth Plaque Score
Weinstein et al., 1996; J Clin Periodontol
Reward schemes

• Very effective in general (on the mean level)
• Operant conditioning is the best-evidenced theory in psychology
• Require reinforcing institution / person
• On societal level: Incentives based on policy decisions (national or insurance-based)
Common-sense model
Common-sense model

- Identity – Symptoms and labels
- Causes
- Duration – Timeline
- Consequences
- Controllability
Identity – Symptoms and labels

• Identify symptoms and label them
Causes

- Plaque, biofilm – stuff on teeth
Time-line: Acute or chronic?

- Periodontitis and caries are chronic diseases
- Progression depends on compliance
Control beliefs

• Belief that own behaviour can control the course of illness
  – Causes
  – Course
  – Consequences

• Belief in one’s ability to correctly perform behaviour
Improving control beliefs

- Demonstration and supervision of oral hygiene behaviours
- Learn correct performance, increase control beliefs
Effects of common sense
(Philippot et al., 2005, J Clin Periodontol)
Motivation and action
Motivation-Behaviour-Gap
Motivation and behaviour

- Even motivated patients perform below recommendations.
- Lack of specific strategies and techniques for transferring motivation into action (volition).
- Address motivation and volition differentially.

(McCaul, Glasgow & O’Neill, 1992, Heal Psy.)
Planning

• Strategic planning cognitively links situational cues to intended action
• Automatic triggering of action in target situation
• Simple and concrete plans comprise of an exact definition of the situation

• WHEN?
• WHERE?
• HOW?
Evidence: Effects of Planning on Flossing

(Sniehotta, Araújo-Soares & Dombrowski, 2007, J Dent Res)

**p < .01; *p < .05**
Evidence: Effects of Planning on Flossing
(Schüz, Wiedemann, Mallach & Scholz, J Clin Periodontol 2009)

- **p < .01; *p < .05**

<table>
<thead>
<tr>
<th>Times flossing / week</th>
<th>Baseline</th>
<th>2 weeks</th>
<th>8 weeks</th>
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</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Planning</td>
<td></td>
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</table>
Evidence: Effects of Planning on Flossing
(Schüz, Wiedemann, Mallach & Scholz, J Clin Periodontol 2009)

Times flossing / week

Baseline 2 weeks

**p < .01; *p < .05

**Control unmotivated
Planning unmotivated
Control motivated
Planning motivated

UTAS
Self-monitoring and behaviour change
Please mark the day you received the calendar in row “week 1“. Then, please mark every day you cleaned between your teeth by indicating the method:


Please return the calendar along with the next questionnaire.

Thank you very much!
Self-monitoring effects
(Schüz, Sniehotta & Schwarzer, 2007; Heal Educ Res)

- Flossed in 14 days
  - did not use diary
  - used diary

- not motivated
- motivated
Comprehensive interventions
(Clarkson et al., 2009; J Dent Res)

Social Cognitive Theory
(Bandura, 1998)

Tell -> Show -> Do

Tell
- This is what you need to do
  - Brush twice a day
  - Brush for 2 minutes
  - Use an electric toothbrush
  - Use fluoride toothpaste
  - Spit, don’t rinse
  - Clean teeth feel smooth to the tongue

Show
- This is how you do it
  Dentist shows toothbrushing technique on model of mouth

Do
- Now, please clean your teeth using this powered toothbrush, so that I can check your technique
  Dentist:
  - Corrects if required
  - Asks how teeth feel
  - Asks if now confident
  - Praises

Plan
- You can have this toothbrush to take home. Before you go, can you tell me when will be the best time for you to use it?
  - Dentist elicits an action plan

Figure. How psychological models were used to frame the delivery of an evidence-based oral hygiene intervention.
Comprehensive interventions
(Clarkson et al., 2009; J Dent Res)
What determines health professionals’ behaviour?

Here's the deal... If you cooperate with me I'll use the good-boy-drill. Jerk me around and you get this.
What determines professionals’ behaviour?

- Rewards
- Common-sense information
- Motivation and action components of changing behaviour
Rewards: Fees for service

- Fees for services are effective incentives to change professional behaviour

Table 2. Primary Outcome Data – Cluster-level Analysis

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Fee</th>
<th>Education</th>
<th>Both</th>
<th>Fee</th>
<th>No fee</th>
<th>Effect Size</th>
<th>CI lower</th>
<th>CI upper</th>
<th>Education</th>
<th>No Education</th>
<th>Effect Size</th>
<th>CI lower</th>
<th>CI upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children with 1 or more</td>
<td>25.3 (25.5)</td>
<td>35.1 (28.4)</td>
<td>27.4 (30.8)</td>
<td>30.8 (23.1)</td>
<td>32.9 (25.7)</td>
<td>26.3 (28.0)</td>
<td>9.8</td>
<td>1.8</td>
<td>17.8</td>
<td>29.1 (27.0)</td>
<td>30.1 (27.2)</td>
<td>4.1</td>
<td>-3.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Sealant per dentist – mean % (SD)¹</td>
<td></td>
<td></td>
<td>Post only</td>
<td>(no baseline adjustment)</td>
<td>7.1</td>
<td>-1.9</td>
<td>16.1</td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>-7.5</td>
<td>10.6</td>
<td></td>
</tr>
</tbody>
</table>

¹ Model adjusted for the cluster level minimization covariates (DEPCAT area of practice, number of partners in practice, throughput of children aged 11-13, and the number of restorative fissure sealants placed on 6’s at baseline); ICC = 0.315.

Planning and dentist behaviour (Bonetti et al., 2003, Br Dent J)

Intervention prompting plans for alternatives to 3rd molar extraction

<table>
<thead>
<tr>
<th>Intention item</th>
<th>Control group Mean (SD)</th>
<th>Intervention group Mean (SD)</th>
<th>Mean difference</th>
<th>Standard error</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Of all the patients you see in the next month who require a third molar extraction, approximately how many do you intend to perform?</td>
<td>0.82 (1.02)</td>
<td>-0.16 (0.94)</td>
<td>0.25</td>
<td>0.21</td>
<td>-0.17 to 0.67</td>
</tr>
<tr>
<td>2. How likely is it that you will extract a third molar within the next month?</td>
<td>0.10 (0.96)</td>
<td>-0.20 (1.06)</td>
<td>0.32</td>
<td>0.21</td>
<td>-0.10 to 0.74</td>
</tr>
<tr>
<td>3. Do you intend to follow the third molar guidelines? [The guidelines support decreasing the number of third molar extractions.]</td>
<td>0.20 (1.07)</td>
<td>-0.40 (0.68)</td>
<td>0.60</td>
<td>0.18</td>
<td>0.25 to 0.95</td>
</tr>
</tbody>
</table>

CI = Confidence interval
Note: Intention item 3 was reversed scored so that higher scores represent greater intention to extract third molars, as with the other Intention items.
Common-sense and training

- Longitudinal study in 56 nursing homes in Berlin, Germany (total of 120 caregivers took part in the study, longitudinal data from 85)
- Mean number of residents = 32.7 (31.8)
- 1 intervention session with trained dental assistants per nursing home
Intervention

• General oral hygiene information based on causes, courses and consequences of oral diseases
• Special focus on needs of care recipients
• Focus on care recipients’ capabilities for oral hygiene with targeted instructions and brushing demonstrations
• Supervision of caregivers’ oral health routines with feedback
Effects on behaviour

Mean brushing time

Pre-test

3 months post-test

Effects on behaviour

Brushing technique

No technique | Any technique | Rotation | Bass

# Predictors of brushing


<table>
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<tr>
<th>Predictor</th>
<th>B</th>
<th>$SE_B$</th>
<th>$\beta$</th>
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<tbody>
<tr>
<td>Vulnerability</td>
<td>.29</td>
<td>.11</td>
<td>.28**</td>
</tr>
<tr>
<td>Intention</td>
<td>.28</td>
<td>.09</td>
<td>.34**</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>.35</td>
<td>.12</td>
<td>.32**</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td></td>
<td>.38</td>
</tr>
<tr>
<td>$F$</td>
<td></td>
<td></td>
<td>13.39**</td>
</tr>
</tbody>
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*Note. **p < .01*
Conclusions

• Behavioural science can help understanding and modifying individual oral health care behaviour

• Principles from behavioural science can be used to modify health professionals’ behaviour:
  – Rewards
  – Plans
  – Vulnerability, Self-efficacy, intention
GOOD TEETH GET NOTICED.