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Interventions for children's dental anxiety: Validating a coping styles scale.



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Some tortures are physical
And some are mental,
But the one that is both
Is dental.

–Ogden Nash

Dental anxiety: Definition(s)

- Anxiety occurring in relation to the experience or expectation of receiving dental care
- Generally viewed as occurring on a continuum.
- Over 35% of the Dunedin longitudinal cohort met criteria for dental anxiety at one of four data collection points
- Associated with avoidance of the dentist (Sohn & Ismail, 2005) and poorer oral health (e.g. Schuller, Willumsen, & Holst, 2003).

The Dental Jungle Project: An Introduction

- A NZ-UK collaborative project headed by Linda Jones
- Involves the development of a computer program to aid in the assessment and management of children's dental anxiety
- The program includes games, information about dentistry, and has an information-gathering component to assist dental staff in providing the most effective anxiety-reducing interventions

The current study

- Given the relatively serious correlates and high prevalence of dental anxiety, it's important to provide interventions that are suitable for diverse ranges of children with differing ways of coping with threat
- The Dental Jungle team was therefore interested in validating a coping styles measure developed by Heather Buchanan at the University of Nottingham (a DJ project member): **The Monitoring Blunting Dental Scale (MBDS)**

Monitoring and blunting: the theory

- Arose out of Miller's (1981) attempts to reconcile inconsistent results for the effect of increased information/predictability on distress and anxiety in threatening situations
- Miller proposed that there are two major modalities for coping with threatening information:

Monitoring – attending to and seeking out information about threatening stressor(s)
Blunting – avoiding or distracting oneself from threatening information

The congruency hypothesis

- A key to the usefulness of monitoring blunting theory is the hypothesis that individuals tend to cope better in threatening situations when they are able to utilise their preferred coping modality – the congruency hypothesis.
- I.e. That “monitors” tend to cope better when provided with lots of information about a stressful situation or medical procedure, while “blunters” tend to cope better when able to avoid or distract themselves from threatening information
- Some evidence that this is the case – e.g. Shiloh et al. (1998), Sparks (1989), van Zuuren, Grypdonck, Crevits, Walke, & Defloor (2006), including in dentistry (Litt, Nye & Shafer, 1995).

How do monitoring & blunting relate to dental anxiety interventions?

- A 2003 study by Buchanan and Niven categorised the dental anxiety management techniques used by paediatric dentists who responded to a conference survey. Techniques congruent with a monitoring modality were far more commonly used. In particular, the “Tell-Show-Do” technique was very popular.
- Similarly, an Australian study found that dentists reported little use of blunting-congruent techniques such as audiovisual distraction (Wright, Giebartowski, & McMurray, 1991)

Scales used to measure monitoring and blunting

A number of scales have been developed to measure individual monitoring or blunting preferences. These include (among others):

- The Miller Behavioral Style Scale (Miller, 1987)
- The Threatening Medical Situations Inventory (van Zuuren, de Groot, Mulder & Muris, 1996)
- The Child Behavioral Style Scale (Miller et al., 1995)

However – these scales tend to measure individuals’ *general* monitoring or blunting preferences across a wide array of (often rather artificial) hypothetical threatening situations. No validated scale currently exists measuring monitoring or blunting preferences in *dental* situations.

Therefore, back to the scale

To this end, Buchanan and Niven (1996) proposed the Monitoring Blunting Dental Scale (MBDS) in a conference presentation.

The MBDS is a 24 item self report scale asking respondents to indicate how likely they would be to utilise a number of different coping strategies in four hypothetical dental scenarios:

- Having an appointment at the dentist tomorrow
- Sitting in the dentist’s waiting room
- Having a tooth drilled
- Having an injection in your gum

MBDS items

- Each scenario is followed by 6 coping strategies: 3 monitoring, and 3 blunting.
- Example monitoring item:
“I would read all of the posters on the wall about tooth decay and dental treatment.”
- Example blunting items:
“I would watch the TV on the wall, if there was one”
“I would try to push any thoughts about the needle or injection out of my head.”
- Respondents are asked to indicate how likely they’d be to use each given coping strategy on a Likert response scale with options of Definitely Not, Probably Not, Probably, and Definitely.

The validation study – details and sample

- A questionnaire including the MBDS was completed by 240 eleven to thirteen year old children at a decile 9 intermediate school in central Auckland.
- The questionnaire was completed in pen and paper form in class.
- The questionnaire also included a dental anxiety measure, another measure of coping styles (for convergent validation), and qualitative questions about what other strategies the children might use in the given hypothetical situations.

The results – MBDS reliability

- The internal consistency reliability of the MBDS subscales (12 items in each) was measured using Cronbach's alpha.
- Monitoring subscale alpha = **.74**
- Blunting subscale alpha = **.76**
- Both of these values indicated acceptable reliability by Nunnally's (1978) criterion of a minimum of 0.7.
- Contrasts somewhat with findings for other monitoring-blunting scales, which often have problematic reliability values for blunting (e.g. Miller, 1987; Miller, Roussi, Caputo & Kruus, 1995).

Convergent validity & the CBSS-M

- Important to assess convergent validity – the degree to which MBDS results converged with those of a related scale
- Most closely related scale: the Child Behavioral Style Scale developed by Miller et al. (1995).
- This scale has four stimulus scenarios, including two stressful medical scenarios (doctor and dentist)
- Each scenario is followed by 4 monitoring strategies (e.g. "I would think about what the doctor might do") and 4 blunting strategies.
- For the purposes of the study, I used only the items relating to these two medical scenarios, with some item revisions. I dubbed this shortened scale the Child Behavioral Style Scale – Medical situations, or CBSS-M.

Results – convergent validity correlations

- Correlation between the MBDS and CBSS-M Monitoring subscales = **.61** ($p < .001$)
- Correlation between the MBDS and CBSS-M Blunting subscales = **.66** ($p < .001$)
- These correlations are suggestive of acceptable convergent validity
- But: no strict standards exist for interpretation
- Further, how should measurement error be accounted for in interpretation?

Discriminant validity and the SFPS

- Also important to assess discriminant validity
- As part of the Dental Jungle project, a computerised measure of dental anxiety called the Smiley Faces Program has been developed (Buchanan, 2005).
- This scale uses the same stimulus scenarios as the MBDS
- A pen and paper version of this scale, dubbed the **Smiley Faces Paper Scale** (SFPS), was used for the current study.
- For each of the four stimulus scenarios is followed by a set of seven faces to select from:



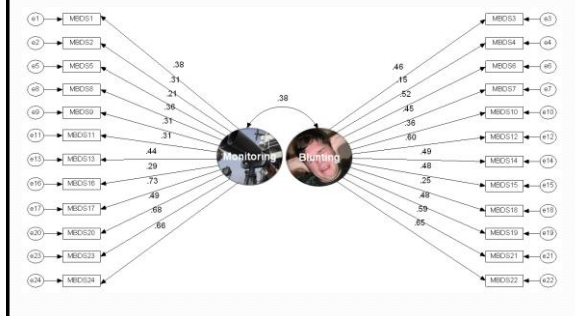
Results – discriminant validity correlations

- Correlation between MBDS Monitoring subscale and dental anxiety = **.08** ($p = .221$) -> acceptable
- Correlation between MBDS Blunting subscale and dental anxiety = **.48** ($p < .001$) -> problematic?
- But how should this relationship be attributed? Measurement problem – or a genuine causal relationship?

Confirmatory Factor Analysis (CFA)

- Allows the researcher to specify a particular model to be tested in terms of its ability to explain the variances of and covariances between a set of variables/items
- In this case the main model tested was a 2-factor monitoring-blunting model.

CFA – main tested model



CFA – model fit

A central difficulty with CFA is how acceptable model fit is to be defined. For the 2 factor model:

- Chi square = 579 (df 251, $p < .001$) – so model fit clearly not perfect
- Standardised Root Mean Residual (SRMR) = .078 and Root Mean Square Error of Approximation (RMSEA) = .074 – so fairly substantial differences exist between the model-predicted and observed covariance matrices, although model error is within rule of thumb limits for reasonable fit ($< .08$)

CFA fit – alternative models

- Alternative models also tested – simple 1 factor model had poor fit (chi square = 798.1, RMSEA = .095), while an increase in complexity to a 4 factor model produced little improvement in fit (RMSEA = .072, chi square = 548.8).
- So the main 2 factor model does well in comparison to main competitors
- Poor fit of the 1 factor model provides strong evidence that monitoring and blunting are not poles of a single dimension, but rather separate, related dimensions.

Conclusions for the scale and theory

- The MBDS has acceptable internal consistency reliability, convergent validity, and factorial validity
- However, discriminant validity with respect to dental anxiety may be a concern for the blunting subscale
- May be useful for future research concerning dental anxiety, coping, and interventions
- Further research is necessary to provide *norms* or an other standards with which to interpret *individual* subscale scores.

References / question time

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