

Testing fidelity in Motivational Interviewing oral health interventions: an example

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Objective: Despite increasing use of MI in oral health settings, little attention has been paid to the integrity of MI delivery (fidelity). In the third of four MI fidelity in oral health manuscripts, we provide an example of MI fidelity assessment in an oral health intervention. **Methods:** A randomised trial was conducted to evaluate effectiveness of a MI intervention on oral health outcomes among low-income African-American children. A total of 1,021 children aged 0–5 years and their caregivers were randomly selected. The intervention comprised oral health-specific MI and a DVD regarding oral health education. All MI interviews were recorded, with a randomly selected subset ($n = 152$, 38.4%) tested for MI fidelity by staff trained in the MITI code. Of this subset, a randomly selected 30 taped sessions were additionally scored by an external group to assess external reliability of the MITI coding. An overall measure of fidelity was created as well as scores for global ratings of empathy and motivational interviewing spirit (comprising evocation, collaboration and autonomy). Percentage of open questions and total reflections were summed. **Results:** When assessed by Detroit Project staff training in the MITI code, all global and behavioural elements compared favourably with recommended MI fidelity standards. Intra-assessor reliability was also high (no ICCs below 0.80). However, the ICCs for different domains reflecting the MITI code for inter-assessor reliability were consistently poor; ranging from 0.25 (total complex reflections) to 0.95 (sum open- + close-ended questions) for one staff member and -0.07 (total complex reflections) to 0.87 (sum open- + close-ended questions) for another. **Conclusions:** In this large study, fidelity to the MI model was modest to poor. The findings illustrate the importance of: (1) selecting staff and researchers who are willing to change; (2) confirming fidelity before project commencement; (3) assessing fidelity throughout study and; (4) independent evaluation of MI integrity.

Key words: Motivational Interviewing, fidelity, oral health

The number of Motivational Interviewing (MI) interventions used in an oral health context has increased markedly in the last five years (Severson *et al.*, 2009; Jonsson *et al.*, 2010; Almomani *et al.*, 2010; Croffoot *et al.*, 2010; Harrison *et al.*, 2010; Ismail *et al.*, 2011; Brand *et al.*, 2013; Cook *et al.*, In Press; Neff *et al.*, 2013). However, few interventions have accurately assessed MI fidelity. There have been suggestions that studies purporting to have conducted a MI intervention not be published unless details around the fidelity assessment and proficiency are reported (Mertens *et al.*, 2013). MI fidelity may not be appropriately measured because of the complexity and cost involved (Llewellyn *et al.*, 2012), for example, the techniques involved in MI fidelity assessment are much more sophisticated than those required for standard reliability assessments of clinical examinations.

There are four central tenants of MI; engaging patients into change dialogue, focusing on the behaviours related to a health condition; evoking ambivalence relative to behaviours and change; and planning for patient-tailored change (Miller and Moyers, 2006). The spirit of MI involves the MI practitioner being collaborative, evocative and respectful of client autonomy. A helpful acronym is OARS; client-centred counselling that is Open-ended, Affirming, Reflecting and Summarising.

The Detroit Dental Health Project was a randomised

controlled trial of an early childhood caries intervention conducted among low income African American families (Ismail *et al.*, 2011). The intervention arm received MI and a DVD (custom-produced with MI-generated goals), while the non-intervention arm received a custom-produced DVD with a list of suggested behaviours. Just over one thousand participating caregivers were recruited at baseline ($n=1,021$), 506 of whom were randomly allocated to the intervention arm and 515 whom were allocated to the control arm. Close to 300 ($n=299$) were followed up from the intervention arm and 300 were followed up in the control arm. Children were aged 0 to 5 years at baseline and were followed up approximately two years later. MI interviewers were master's-level therapists who had attended a basic two-day MI training course. Supervised training was continued for an additional four weeks. Throughout the data collection phase, MI interviewers were provided weekly feedback by an MI expert. All interviews were recorded, with a randomly selected subset ($n = 152$, 38.4%) of the taped sessions scored by project staff trained in MI using the Motivational Interviewing Treatment Integrity (MITI) code (Moyers *et al.*, 2005). Of this subset, a randomly selected 30 taped sessions were additionally scored by an external group from San Diego State University (SDSU) to assess external reliability of the MITI coding.

The MITI coding schedule comprises two components; global scores (measured on a Likert scale) and behaviour counts. The global scores assess empathy (understanding the client's perspective, reflective listening, interest and understanding) and MI spirit (evocation, collaboration and autonomy). Behaviour counts are undertaken for MI-adherent statements (asking permission, affirming, emphasising control, support), MI non-adherent statements (advising, confronting, directing), questions (open and closed) and reflections (simple and complex). An example of a simple reflection is: 'you don't think your child will have a problem drinking a sugared drink'. An example of a complex reflection (amplified) is: 'drinking sugared drinks has never really caused any problems or unpleasant effects in your life', while an example of a double-sided reflection is: 'you think you drink sugared drinks too often at times and also you don't think that causes any problem for your teeth.'

Benchmark standards for measures of empathy, MI spirit, reflection/question ratio and percent open-ended questions are presented in *Table 1*. On every measure, the Detroit Project MITI coding outcomes were better than the benchmark standards. More specific descriptive MITI code measures from the Detroit Project are presented in *Table 2*.

As a general rule regarding reliability, intra-class correlation coefficients (ICCs) below 0.40 are considered 'poor', 0.40–0.59 are 'fair', 0.60–0.74 are 'good' and 0.75 or above are 'excellent' (Cicchetti, 1994). The intra-assessor reliability scores are presented in *Table 3*; Staff 1 performed better than Staff 2, but all ICCs were in the 'excellent' range. The external expert, SDSU, had the highest scores.

The inter-assessors' reliability scores are presented in *Table 4*. Compared to the gold standard (SDSU), in the first round, Staff 1 was 'good' for empathy and 'good' for MI spirit, yet the total MI adherent score was 'fair'. The total complex reflection score (0.47) was fair, while percent open-ended questions was excellent (0.79). Staff 1 was a little better in the second round; 'good' for empathy, 'excellent' for MI spirit, with a total MI adherent score being 'good'. However, total complex reflection score was poor (0.25), while percent open-ended questions, at 0.60, was 'good'. Using the same comparator, in the first round, Staff 2 was 'fair' for empathy and 'good' for MI spirit, yet the total MI adherent score was 'poor'. The total complex reflection score was very poor (0.11), as was percent open-ended questions (0.02). Staff 2 was both better and worse in the second round; 'good' for empathy, 'good' for MI spirit, with a total MI adherent score being 'poor'. Total complex reflection score was very poor (-0.07), while percent open-ended questions, at 0.33, was 'poor'. These estimates suggest that the MITI coding, as scored by the experts, was not comparable with the ratings given by the actual deliverers of the intervention. The intervention itself was not successful at preventing early childhood caries, but the MI fidelity findings suggest this may be because MI, in its essence, was not delivered. The findings illustrate the importance of ensuring that MI is conducted as it is truly meant to be conducted. Testing the fidelity of the MI interview intervention is the only way this can be done.

Recommendations arising from this study include; (1) selecting staff and researchers who are willing to change (two staff

resigned during the process of this study); (2) confirming fidelity before commencement of the project (two-four weeks of training recommended) and MITI assessments; (3) assess fidelity throughout study and; (4) independent evaluation of MI integrity.

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REFERENCES

- Almomani F, Williams K, Catley D, Brown C. Effects of an oral health promotion program in people with mental illness. *J Dent Res* 2009; **88**: 648-652.
- Brand V, Bray K, Macneill S, Catley D, Williams K. Impact of single-session motivational interviewing on clinical outcomes following periodontal maintenance therapy. *Int J Dent Hyg* 2013; **11**:134-141.
- Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychol Assess* 1994; **6**: 284-290
- Cook PF, Richardson G, Wilson A. Motivational interviewing training to promote Head Start children's adherence to oral health care recommendations: results of a program evaluation. *J Public Health Dent* In Press.
- Croffoot C, Krust Bray K, Black MA, Koerber A. Evaluating the effects of coaching to improve motivational interviewing skills of dental hygiene students. *J Dent Hyg* 2010; **84**: 57-64.
- Harrison RL, Veronneau J, Leroux B. Effectiveness of maternal counseling in reducing caries in Cree children. *J Dent Res* 2012; **91**:1032-1037.
- Ismail AI, Ondersma S, Jedele JM, Little RJ, Lepkowski JM. Evaluation of a Brief Tailored Motivational Intervention to Prevent Early Childhood Caries. *Community Dent Oral Epidemiol* 2011; **39**: 433-448.
- Jönsson B, Ohrn K, Lindberg P, Oscarson N. Evaluation of an individually tailored oral health educational programme on periodontal health. *J Clin Periodontol* 2010; **37**: 912-919.
- Llewellyn C, Abraham C, Miners A, Smith H, Pollard A, Benn P, Fisher M. Multicentre RCT and economic evaluation of a psychological intervention together with a leaflet to reduce risk behaviour amongst men who have sex with men (MSM) prescribed post-exposure prophylaxis for HIV following sexual exposure (PEPSE): a protocol. *BMC Infect Dis* 2012; **12**: 70.
- Mertens VC, Goossens ME, Verbunt JA, Köke AJ, Smeets RJ. Effects of nurse-led motivational interviewing of patients with chronic musculoskeletal pain in preparation of rehabilitation treatment (PREPARE) on societal participation, attendance level, and cost-effectiveness: study protocol for a randomized controlled trial. *Trials* 2013; **14**: 90.
- Miller WR, Moyers TB. Eight Stages in Learning Motivational Interviewing. *J Teaching Addictions* 2006; **5**: 3-17.
- Miller WR, Yahne CE, Moyers TB, Martinez J, Pirritano M. A randomized trial of methods to help clinicians learn motivational interviewing. *J Consult Clin Psychol* 2004; **72**:1050-1062.

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Moyers TB, Martin T, Manuel JK, Hendrickson SML, Miller WR. Assessing competence in the use of motivational interviewing. *J Subst Abuse Treat* 2005; **28**: 19-26.

Neff JA, Walters ST, Braitman AL, Kelley ML, Paulson JF, Brickhouse TH, Gunsolley JC, Darby ML, Lemaster MF, Vandersluis JP, Walsh MM. A brief motivational intervention for heavy alcohol use in dental practice settings: Rationale and development. *J Health Psychol* 2013; **18**: 542-553.

Severson HH, Peterson AL, Andrews JA, Gordon JS, Cigrang JA, Danaher BG, Hunter CM, Barckley M. Smokeless tobacco cessation in military personnel: a randomized controlled trial. *Nicotine Tob Res* 2009; **11**: 730-738.

Table 1. Benchmark standards (Miller *et al.*, 2004) and Detroit Project scores for key MITI measures

Measure	Benchmark	Detroit Project
Empathy	5.0	5.1
Spirit	5.0	5.3
Reflection/question ratio	1.4-2.0	2.4
Percent Open-Ended Questions	59%	71%

Table 2. Descriptive Statistics MITI data for Detroit Project: N = 152

Measure	Mean	Median	95%	CI
Empathy (range 1 to 7 (high))	5.14	4.00	4.80	5.48
Spirit (range 1 to 7 (high))	5.32	5.00	4.99	5.64
Total MI adherent score	3.01	3.00	2.63	3.38
Total close questions score	5.50	5.00	4.83	6.17
Total open questions score	11.30	11.00	10.62	11.97
Total simple reflection score	7.43	6.00	6.61	8.26
Total complex reflection score	2.88	3.00	2.51	3.26
Open-ended + Close-Ended questions	16.80	16.00	15.63	17.96
Percent Open-Ended Questions	71%	70%	69%	73%

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Table 3. Intra-assessor reliability scores for Detroit Project MITI scores

	Staff 1 - 1 st vs 2 nd n=28		Staff 2 - 1 st vs 2 nd n=30		SDSU - 1 st vs 2 nd n=30	
	ICC	95% CI	ICC	95% CI	ICC	95% CI
Empathy	0.95	0.88, 0.98	0.80	0.59, 0.91	0.99	0.98, 0.99
Spirit	0.97	0.94, 0.99	0.87	0.73, 0.94	1.00	1.00, 1.00
Total MI adherent score	0.88	0.75, 0.95	0.86	0.74, 0.93	0.98	0.96, 0.99
Total open questions score	0.99	0.98, 1.00	0.94	0.88, 0.97	0.95	0.91, 0.98
Total simple reflect score	0.39	-0.30, 0.71	0.93	0.84, 0.97	0.98	0.97, 0.99
Total complex reflect Score	0.97	0.95, 0.99	0.90	0.80, 0.98	0.93	0.85, 0.97
Open-ended + Close-Ended questions	0.98	0.95, 0.99	0.98	0.97, 0.99	0.98	0.97, 0.99
Percent Open-Ended Questions	0.98	0.97, 0.99	0.81	0.61, 0.91	0.91	0.81, 0.96

Table 4. Inter-assessor reliability scores for Detroit Project MITI scores

	Staff 1 1 st vs SDSU 1 st n=30		Staff 1 2 nd vs SDSU 2 nd n=30	
	ICC	95% CI	ICC	95% CI
Empathy	0.60	0.16, 0.81	0.68	0.34, 0.85
Spirit	0.60	0.16, 0.81	0.80	0.57, 0.90
Total MI adherent score	0.55	0.52, 0.79	0.63	0.23, 0.83
Total open questions score	0.80	0.59, 0.91	0.90	0.78, 0.95
Total simple reflect score	0.75	0.47, 0.88	0.78	0.54, 0.90
Total complex reflect Score	0.47	-0.12, 0.75	0.25	-0.58, 0.64
Open-ended + Close-Ended questions	0.92	0.84, 0.96	0.95	0.90, 0.98
Percent Open-Ended Questions	0.79	0.55, 0.90	0.60	0.16, 0.81
	Staff 2 1 st vs SDSU 1 st n=28		Staff 2 2 nd vs SDSU 2 nd n=28	
	ICC	95% CI	ICC	95% CI
Empathy	0.51	-0.06, 0.77	0.61	0.16, 0.82
Spirit	0.66	0.27, 0.84	0.64	0.23, 0.83
Total MI adherent score	0.31	-0.47, 0.68	0.34	-0.40, 0.69
Total open questions score	0.76	0.48, 0.89	0.82	0.62, 0.92
Total simple reflect score	0.43	-0.21, 0.73	0.39	-0.30, 0.71
Total complex reflect Score	0.11	-0.89, 0.58	-0.07	-1.28, 0.50
Open-ended + Close-Ended questions	0.81	0.59, 0.91	0.89	0.76, 0.95
Percent Open-Ended Questions	0.02	-1.08, 0.54	0.33	-0.42, 0.69