Measuring adaptations of motivational interviewing: the development and validation of the behavior change counseling index (BECCI)

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Abstract

One of the most common challenges faced by health professionals is encouraging patients to change their behavior to improve their health. This paper reports the development of a checklist, the behavior change counseling index (BECCI). This aims to measure practitioner competence in behavior change counseling (BCC), an adaptation of motivational interviewing suitable for brief consultations in healthcare settings. The checklist has demonstrated acceptable levels of validity, reliability and responsiveness, and aims to assist trainers and researchers in assessing change in practitioner behavior before, during and after training in BCC. BECCI will also provide valuable information about the standard of BCC that practitioners were trained to deliver in studies of BCC as an intervention.
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1. Introduction

Consultations about behavior change are fairly widespread in healthcare settings, and usually involve talking to patients about changes in lifestyle (e.g. diet, exercise, smoking, alcohol) and medication use. They occur in most settings (primary, secondary and tertiary care), and embrace both the management and prevention of a wide range of conditions, for example, diabetes, asthma and heart disease.

It has been suggested that these consultations present particular challenges to practitioners and patients alike [1]. Among their main characteristics is the potential for disagreement about why, how and when change might occur. Value judgements about resistant or unmotivated patients are often close to the surface, and quasi-psychoanalytical terms like "being in denial" are often used to describe patients who apparently do not see the need for change. Efforts to find constructive ways through these consultations have emerged in the form of the stages of change model [2] and

motivational interviewing [3]. At their heart is an attempt to encourage patients to be more active in the consultation, to think aloud about the importance of change and their confidence to achieve it.

Systematic reviews of motivational interviewing and its adaptations point to a lack of precision about what skills were actually used by practitioners in a wide range of controlled trials [4,5]. Guidelines for evaluating complex interventions [6], which stress the need to focus on the training of practitioners in skills that are reliably measured, have often been bypassed by enthusiasm to conduct controlled trials that look primarily at patient outcomes [7]. It is only recently that efforts to list essential skills have emerged, thus opening up the possibility to develop reliable measures.

One recent development has been the description of *behavior change counseling* (BCC)—an adaptation of motivational interviewing which might be suitable for brief consultations about behavior change in healthcare settings [8]. Many of the skills overlap with motivational interviewing, while some of the more psychotherapeutic elements of the "parent method" have been omitted. This paper describes the development of The behavior change counseling index (BECCI)—a scale for use by trainers and researchers

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when helping practitioners to learn the essential skills of BCC.

1.1. The relationship between motivational interviewing and behavior change counseling

Although motivational interviewing and behavior change counseling are related methods, they are somewhat different in nature [8]. Motivational interviewing is a style of counseling amenable for use by psychotherapists (though not restricted to them), and incorporates a number of skills found in generic counseling, such as using open questions and reflective listening [3]. However, these skills are used not only to understand the client's perspective, but to selectively and strategically elicit 'change talk' (e.g. commitment language) from a client, and to 'develop discrepancy'—a way of pointing out conflicts between the client's current behavior and their personal values [3].

BCC was developed for brief healthcare consultations with a more modest goal in mind: simply to help the person to talk through the why and how of change, with the practitioner's main task being to understand how the person is feeling and what plans they might have for change. The practitioner uses listening skills to understand the patient's perspective, but not with a view to strategically eliciting change talk and developing discrepancy as in motivational interviewing [8]. BCC is linked to the patient centered method of consulting [9], and incorporates many of the skills and principles from motivational interviewing [3]. It can be used in both help-seeking and opportunistic settings. Many skills used in BCC overlap with motivational interviewing—for example, demonstrating respect for patient choice, asking open questions, using empathic listening, summarizing and so on [8].

1.2. Rationale for designing a new measure

There is a range of instruments available to measure patient centredness in its pure form, and general physician–patient interaction [10,11]. However, none are specific to the topic of health behavior change, and the microskills of motivational interviewing and behavior change counseling are largely absent from these measures.

There is one instrument currently available for measuring motivational interviewing—the Motivational Interviewing Skill Code (MISC) [12–14]. This is a research tool, which requires three passes or phases of analysis. The first pass consists of global ratings for the therapist, client and the relationship between them. It focusses on the spirit of the consultation rather than specific microskills. The second pass provides tally charts to count the number of specific client and therapist behaviors. Thirdly, total talk time for the therapist and the client is calculated.

Although the MISC has proved to be a useful research tool [13–15], there are a number of factors that make it unsuitable for use as a training tool. It is a lengthy instrument that requires three passes. Although it has been suggested that one pass could be used for BCC consultations, this would be difficult, as there are three sections to code (the globals, behavior counts and timing) and this threatens to reduce rater reliability. There are also a number of subsections that would not be essential for trainers in BCC to assess—for example, items on the specific type of reflective listening strategy used. Shortening the MISC to simply include the global ratings would not be suitable for trainers, as information regarding the acquisition of microskills would be lost. Work done by Boycott concluded that MISC was not suitable for training purposes—rating was time consuming and expensive, and the point was made that although the MISC provided counts of actual behaviors, it did not provide an assessment of the overall strength of those behaviors [16]. Therefore, it was felt that a new measure needed to be designed, specifically with BCC trainers in mind, that was brief, could be coded in one pass, and focussed on the spirit and principles of BCC.

1.3. The development of BECCI

Our strategy was to design an instrument that could be used either in training itself as an aid to learning, or as a tool for assessing improvement in competence associated with training. The aim was therefore to focus on practitioner consulting behavior and attitude, rather than the response of the patient. We wanted BECCI to be scored as easily as possible (as trainers are often subject to time constraints when assessing competence), and therefore conducted the initial psychometric work using audio-recordings rather than transcripts. Finally, we decided to examine reliability and validity using mainly simulated patients, since these are more commonly used in training than real patients.

2. Method

A summary of the development process can be viewed in Fig. 1. A number of different data sets were used in the development of BECCI. The details of each data set can be found in Table 1.

2.1. Item development and validity

Following a literature review 38 items were generated, which were based on the theory and practice of BCC [8]. These items were subdivided into four domains coherent with the construct of BCC: agenda setting and permission seeking; the how and why of change in behavior; the consultation as a whole; and talk about targets.

The items were circulated to 12 experts in the fields of motivational interviewing and BCC. Nine of the 12 participants approached provided feedback. They individually rated the items' relationship to BCC on a scale from 1 (not at all) to 5 (extremely). They also commented on the items'
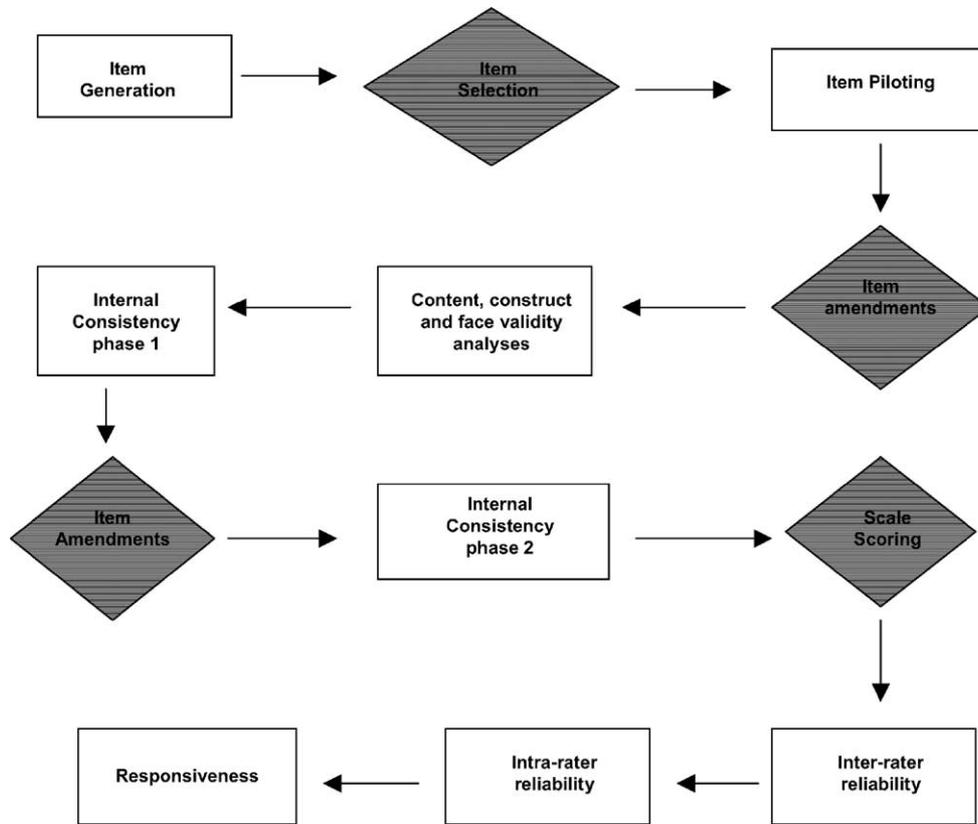
Fig. 1. The process of the development of BECCI.

content validity. Items were selected, rejected and reformulated based on these assessments [16].

The remaining 20 items were then subjected to a number of tests. A researcher (MHT) rated data set 1 using the checklist. These consultations were selected as model consultations of good and bad BCC, which were used for training purposes. Frequency tally charts were also used

to aid the selection of the most applicable items for the checklist—non-endorsed items were removed from the checklist [16]. The same researcher also rated data sets 2 and 3, to ensure that the checklist items were displaying content validity [16].

The items were then piloted by two researchers trained in BCC (CL and SR), who independently scored data set 4.

Table 1
Data sets used in the development of BECCI

Data set number	Consultation type	No. of consultations	Contribution
1	Training video consultations of model BCC	8	Item selection
2	Simulated primary care consultations about lifestyle change	16 (8 pre-training, 8 post-training), from 8 participants	Content validity analysis
3	Real consultations following training in BCC about smoking cessation	12	Content validity analysis
4	Simulated smoking cessation consultations, selected arbitrarily from data set 6	20	Content validity analysis
5	Simulated smoking cessation consultations, selected arbitrarily from data set 6	5	Content validity analysis
6	Simulated smoking cessation consultations, gathered from two workshops on health behavior change	74 (37 pre-training, 37 post-training), from 37 participants	Internal consistency analysis
7	Simulated smoking cessation consultations, selected arbitrarily from data set 6	24	Inter- and intra-rater reliability analysis
8	Simulated diabetes consultations, taken from various stages of a training program [20]	24 (from 6 participants)	Inter- and intra-rater reliability analysis

They discussed their findings in relation to content validity. Items were modified, and then cross-checked against data set 5.

These items were subjected to a construct explication exercise [17]. Construct explication is a technique where a description of the relationship between specific behaviors and abstract constructs is provided, hence investigating the construct validity of items. By carrying out this exercise, it was possible to check that all items were measuring BCC and not related constructs, such as patient centredness or brief advice. Construct explication showed that all items were centrally related to BCC and closely related to motivational interviewing, which was expected as BCC is derived from motivational interviewing. The items were then circulated to the same experts (as above) in the field of BCC to check that they were coherent with the BCC construct.

Finally, the face validity of the checklist was assessed. It was found that although the items were all centrally related to BCC, some items concentrated on patient rather than practitioner behaviors. Since the core construct of the checklist is practitioner behavior, patient oriented items were rephrased.

2.2. Reliability

2.2.1. Internal consistency

The checklist was tested for internal consistency against data set 6 [18]. The consultations were split into two groups for analysis—baseline (before training) and final (after training), to ensure that the data was not distorted by intervention effects.

Items were separated into 'core' and 'non-core' items for analysis. Core items are those that need to be completed for every consultation. Non-core items are those that can be scored as 'not applicable' (for example, a particular practitioner behavior may not be carried out in every BCC consultation, but needs to be assessed by an item when it is). As non-core items were not scored in every consultation, they were analyzed separately.

Core items were assessed by calculating the inter-item correlations, item-total correlations, Cronbach's Alpha, Alpha when item deleted and a single factor solution on SPSS [19]. Non-core items were analyzed using descriptive statistics (overall scale mean, item means and inter-item correlations). This analysis took part in two phases—the initial phase looked at the internal consistency of the existing items, and any necessary changes were made to the items based on these results. Following this initial analysis, the internal consistency tests were re-executed on the amended scale.

2.2.2. Inter-rater reliability

Data sets 7 and 8 [20], were rated independently by two researchers (CL and KE) using BECCI, who gave each consultation one pass. The raters were permitted to consult the manual during the scoring period, but were not allowed to consult each other during this process.

Reliability was estimated by calculating single measure intraclass correlation coefficients [18], using SPSS [19]. The data were separated into two groups for analysis—smoking cessation and diabetes—to establish whether the type of consultation had an effect on the reliability of the checklist.

2.2.3. Intra-rater reliability

The inter-rater reliability exercise described above was repeated by the same researchers 10 weeks later. Again, data sets 7 and 8 were used and results were analyzed using single measure intraclass correlation coefficients [18].

2.3. Responsiveness

The standardized response mean (SRM) is the most commonly used statistic for calculating responsiveness. In this instance, attention was focussed on changes in BECCI scores before and after training. This was calculated by dividing the mean change in BECCI score by the standard deviation of that change [21]. A score of 0.8 or above is thought to show a high level of responsiveness. This statistic was calculated for data set 6 (as this was the only set that had acceptable numbers of participants).

3. Results

3.1. Internal consistency

Initial internal consistency (phase 1) testing showed that the item on information exchange did not correlate with the rest of the items, as information exchange was not occurring in every consultation (but when it did, it needed to be assessed). The item was therefore given non-core status. The item dealing with practitioner talk time was found to have a negative weighting effect. As it was an important element of BCC, and therefore important to record, it was removed from the scale, but remained on the checklist as an ordinal indicator, so that this information was available for trainers and trainees.

Following the initial changes, the internal consistency tests were re-executed (phase 2). The items and the corresponding item numbers can be viewed in Table 2.

In the core item analysis, the mean inter-item correlation was 0.22 for the baseline consultations and 0.14 for the final consultations. The score for Cronbach's Alpha in the baseline consultations was $\alpha = 0.71$, and $\alpha = 0.63$ in the final consultations. The item-total correlations and Cronbach's Alpha (if item deleted) scores can be found in Table 3. The results of the single factor solution can be found in Table 4.

The results show that item 2 in the baseline consultations, and items 4 and 5 in the final consultations were displaying inconsistency. These items displayed low item-total correlations, indicating that they were not correlating with the

Table 2
List of items on BECCI[a]

Item
1. Practitioner invites the patient to talk about behavior change
2. Practitioner demonstrates sensitivity to talking about other issues
3. Practitioner encourages patient to talk about current behavior or status quo
4. Practitioner encourages patient to talk about change
5. Practitioner asks questions to elicit how patient thinks and feels about the topic
6. Practitioner uses empathic listening statements when the patient talks about the topic
7. Practitioner uses summaries to bring together what the patient says about the topic
8. Practitioner acknowledges challenges about behavior change that the patient faces
9. When practitioner provides information it is sensitive to patient concerns and understanding
10. Practitioner actively conveys respect for patient choice about behavior change
11. Practitioner and patient exchange ideas about how the patient could change current behavior

[a] Score range: not at all (0) to a great extent (4). Copies of the full scale and manual are available at http://www.ucwm.ac.uk/csu.

Table 3
Item-total correlations and Cronbach's α (if item deleted) scores of core items—internal consistency

Item number	Baseline		Final	
	Item-total correlation	Alpha if item deleted	Item-total correlation	Alpha if item deleted
1	0.62	0.64	0.30	0.61
2	0.11	0.74[a]	0.34	0.60
3	0.36	0.69	0.19	0.62
4	0.30	0.70	0.12	0.64[a]
5	0.23	0.71	−0.02	0.65[a]
6	0.50	0.66	0.33	0.60
7	0.39	0.68	0.31	0.60
8	0.45	0.67	0.59	0.54
10	0.56	0.65	0.60	0.50

[a] α increases if item is deleted.

scores of the other items in the scale. The single factor solution showed a low factor loading for item 2 (baseline) in relation to the other items, and a negative loading for item 5 (final), which can point to the items not measuring a common construct.

These inconsistencies could be explained for each item by lack of training at baseline, and the intervention effect in the final consultations (which are described in more detail in Section 4). Therefore, it was felt that the checklist was measuring one common construct, and the core items remained unchanged.

Table 4
Factor loadings of core items—internal consistency

Item number	Factor loading (baseline)	Factor loading (final)
1	0.786	0.265
2	0.190	0.280
3	0.488	0.256
4	0.345	0.175
5	0.391	−0.103
6	0.540	0.420
7	0.447	0.457
8	0.549	0.813
10	0.557	0.802

The overall scale mean, item means and inter-item correlations were analyzed to test the non-core items (9 and 11). The results showed that the scores correlated irrespective of the status of items 9 and 11, and that the items were displaying internal consistency in relation to the other items.

3.2. Inter-rater reliability

Coefficients of $R = 0.79$ for smoking cessation and $R = 0.93$ for diabetes consultations were calculated. This shows that the checklist is displaying a consistently good level of reliability between raters, and that the level of reliability is slightly higher for this set of diabetes consultations, than for the selection of smoking cessation consultations.

3.3. Intra-rater reliability

The coefficients for rater one were $R = 0.66$ for smoking cessation, and $R = 0.90$ for diabetes. The coefficients for rater two were $R = 0.60$ for smoking cessation and $R = 0.87$ for diabetes. These results show that BECCI has a moderate to good level of reliability across time. As with the inter-rater reliability results, the diabetes consultations

appear to be more reliable than the smoking cessation consultations.

3.4. Responsiveness

The sensitivity of BECCI to change before and after training was reflected in an SRM of 1.76. In other words, there was a clear shift in practitioner performance following training in BCC, and BECCI was able to detect this change.

4. Discussion and conclusion

Although the MISC has shown to be of potential use for researchers and trainers in motivational interviewing [15], its length and nature have been highlighted as unsuitable for trainers in BCC [14,16]. This new tool, BECCI, shows potential as a measure of practitioner competence in BCC, an adaptation of motivational interviewing. The focus of this paper has been on its use in simulated consultations in training, the primary context in which BECCI will be used.

Although the checklist was tested on audio data, it is acknowledged that video data was used early in the development of BECCI. This is because these consultations were the best models available of what constitutes good and bad BCC, and they were chosen for their consistency. Despite existing research, which has shown minimal difference between scoring an audiotaped and videotaped consultation with a measure of patient centredness [22], the researchers (MHT and CL) took care to analyze only the content of what was said, rather than the related construct of body language. The majority of the data used to develop the checklist was actual training data, or real consultations that were audio-recorded at different stages of training in BCC that were used for training purposes, which was the type of data on which BECCI was likely to be used. Although this data was not without its problems (inconsistency), having contextual knowledge of what the training covered provided explanations for any inconsistencies found, and also highlighted the importance of having stable data during the early developmental phase.

While the overall levels of reliability were acceptable, the checklist did display low internal consistency scores (e.g. items 4 and 5) in the final consultations, reflected by a Cronbach's Alpha of less than 0.7 and a negative value in the factor solution. However, this could be explained by the training intervention; the workshops focussed mainly on understanding the patient's views about smoking rather than just concentrating on change, and on using empathic listening rather than always asking questions. As Miller and Mount [15] discovered in a study of training in motivational interviewing, it takes time to learn and practice new skills. They found that although using these skills led to increases in scores on most MISC items, this led to a decrease in the genuineness item, due to the practitioner not feeling at ease in using their new skills. Such instability following training

is also reflected in our data. It is believed that as a result of the training they received in BCC, practitioners talked less about how the patient felt about change, and asked fewer questions. As with learning any new skill, it takes time and practice to get the balance right.

There was also a low factor loading for item 2 (practitioner demonstrates sensitivity to talking about other issues) in relation to the other items at baseline. This can be explained by the lack of training in addressing separate issues at baseline, and was reflected by a change in factor loading in the final consultations, following training in agenda setting/other factors affecting behavior change.

The checklist demonstrated good levels of inter-rater and intra-rater reliability. The data was divided into two categories of consultation for analysis—smoking and diabetes—and although both demonstrated good levels of reliability, there were differences in the intraclass correlation coefficients. One possibility is the difference in sample size—as the diabetes sample is smaller than the original smoking sample (from which an equal number of consultations were selected), there could be less variability. Another possibility is due to a difference in skill level between the two groups of practitioners. The diabetes consultations were conducted by practitioners who were less skilled in BCC than those in the smoking cessation consultations. The raters commented that they found it easier to score consultations at either end of the spectrum (rather than when it was a 'close call' around the center of the scale), which may indicate that their scoring was slightly less reliable when the scores were not at the extreme points of the scale [18].

BECCI also demonstrated excellent responsiveness to change, which again demonstrates its suitability for the training context in which it will be used.

4.1. Scale scoring

As the checklist was designed for training purposes, and would therefore need to be scored in a relatively short period of time, a one-pass scoring system was chosen, supported by a scoring manual. Items were formatted using identical 5-point Likert scales, to indicate either the frequency or the strength with which a practitioner behavior had occurred, ranging from 0 (not at all) to 4 (a great extent).

To give an example of a score on an item that reflects frequency, a high score on item 6 would indicate the frequent use of empathic listening statements throughout the consultation. A low score on this item would suggest that empathic listening statements were barely used, or indeed not used at all.

An example of an item that reflects strength would be item 1. A high score on this item would indicate that the practitioner has explicitly asked the patient's permission to talk about behavior change, making it clear that the patient is not obliged to make any decisions regarding their behavior. A low score would indicate that the practitioner has not asked permission to talk about behavior change and has proceeded

to start the consultation without asking the patient if they were happy to discuss the topic.

It is not possible to provide a full and comprehensive guide as to how to score each item on BECCI within the confines of this paper. The scale and the user manual can be obtained from http://www.uwcm.ac.uk/csu.

To derive an overall practitioner BECCI score, the mean score across all 11 items is calculated. As the non-core items were found to be correlating with the core items, mean substitution is used to give a score to the non-core items that are scored 'not applicable'. This involves calculating the mean of all the scored items, and using that mean as a replacement score for each item marked 'not applicable'. A mean across all 11 items is then calculated to derive the BECCI score. It takes approximately 1 min to score a 10-min consultation in this way.

4.2. Limitations and further research

There are a number of limitations to this study. Firstly, BECCI has only been tested for validity and reliability on simulated consultations. Although this is suitable for the purpose for which BECCI has been primarily developed, there is a potential limitation that it may not prove to be reliable in real consultations. However, many pieces of research have reported that the widely accepted practice of using standardized patients when training practitioners in communication is often a realistic and helpful one in training [23], and a new phase of research, already begun, is focussing on the reliability and validity of the checklist when looking at practitioner performance in real consultations. This seeks to establish whether BECCI would be a valuable tool for practitioner *performance* in delivering BCC, as well as *competence* in BCC skill. Until these results are available, any data generated from real consultations should be interpreted with caution.

Another limitation of BECCI is that it focusses purely on the practitioner behaviors rather than patient behaviors, which may prove to be a missing vital element if it is possible to use BECCI for research on real consultations. Elwyn et al. [24], in the development of the OPTION scale, argue that leaving out this information fosters a missing link in researching the relationship between patient involvement and outcomes. The MISC does incorporate scores on patient as well as practitioner behaviors, providing a useful dimension in examining patient outcomes. As BECCI was designed for training purposes, this is not currently an issue, but if following further investigation it is anticipated that BECCI may be suitable for use with real consultations, it is important to establish whether there is a suitable measure of patient behavior available that may be able to investigate this aspect of the BCC process.

Further work on simulated consultations will examine the reliability of the scale when a BCC consultation is observed and rated at the same time, and will also investigate correlations between checklist scores and those from other measures of motivational interviewing (concurrent validity) [12–15]. More research into the validity of BECCI will focus on the correlations between practitioner BECCI scores and changes patients make to their lifestyle, and will also investigate practitioner change over time following training in BCC.

4.3. Practice implications

The need to communicate effectively with patients about lifestyle change is a growing pressure for practitioners, especially when taking into account strategies such as the National Service Frameworks [25] for health problems such as heart disease and diabetes. Patients, for their part, deserve consultations that are skillfully and respectfully carried out. However, before the efficacy of BCC can be evaluated reliably, it needs to be measured and practitioners' competence monitored before looking at patient outcome data. Trainers need to know how to tailor and evaluate their training effectively, and conclude that practitioners are using BCC to an acceptable standard to deliver it as part of larger trials.

BECCI makes it possible for trainers to assess practitioner competence in BCC and provides a quick evaluation of which skills the practitioner needs to improve on to deliver good BCC. Researchers may also find the scale useful to evaluate training, and its impact on a range of outcomes. As noted above, however, we await evidence of reliability and validity in real consultations.

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