Reporting standards for studies of tailored interventions

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Abstract

Message tailoring is a promising innovative approach to persuasive communication that involves designing messages to meet a person’s psychological, behavioral and/or demographic characteristics. Although the tailored intervention literature has many strengths, a weakness is inconsistency in reporting information related to intervention development, implementation and evaluation. The objective of this manuscript is to report recommendations for studies of tailored interventions. As part of ongoing original empirical and meta-analytical research, we reviewed the tailoring literature and identified inconsistencies in reporting. We compared these inconsistencies with existing reporting standards and developed recommendations specific to tailored interventions. An advisory board of preeminent tailoring researchers provided feedback on draft and final recommendations. This paper offers the resulting seven recommendations for reporting studies of tailored interventions. If we are to build a cumulative science of tailoring, both for theory development and research translation, then we should establish standards in the conduct and reporting of the science.

Introduction

Message tailoring is a promising innovative approach to persuasive communication that involves designing messages to meet a person’s psychological, behavioral and/or demographic characteristics. Tailoring has been formally defined as ‘any combination of strategies and information intended to reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest and derived from an individual assessment’ [1] (p. 277). It also considers ‘the contexts or frames surrounding the content, by whom it will be presented and even through which channels it will be delivered’ [2] (p. 454). Tailoring is distinct from targeting, which involves designing messages to reach a subgroup of a population [3]. Tailoring research began appearing in the literature in the 1990s [4–8] and, with advances in computer technology, has increased dramatically in recent years. Most extensively found in the health communication domain, tailored messaging is theoretically applicable to any communication context. A number of reviews and meta-analyses demonstrate that tailored messages lead to improved persuasive outcomes in terms of attitude, behavioral intention and behavior change [9–16].

Because the message tailoring literature continues to expand and shows such great promise, we would like to call attention to the importance of establishing reporting standards for these studies. We recently have completed several reviews of the tailored health literature [9, 15, 16] and observed a good deal of inconsistent reporting of information related to intervention development, implementation and evaluation. It is understandable that researchers may be so familiar with their intervention that they may overlook
certain aspects when reporting on it. However, as
scholars concerned with standardized reporting have
noted [17], readers should not have to speculate about
or infer information that is arguably central to the
understanding and evaluation of studies and their
findings.

The tailoring literature is not unique in problem-
atic reporting. There is evidence of inconsistent,
incomplete and sometimes misleading reporting of
information across numerous literatures. Calls are
coming from fields as diverse as health economics
[18], medical education [19], engineering [20] and
biotechnology [21] to remedy the situation. Such
calls are warranted when we consider the rationale
for standardized reporting. First, information about
study design, participants, analysis and so forth
should be transparent so that readers can readily
understand what is being reported. Related, stan-
dardized reporting facilitates readers’ assessment
of internal and external validity. It also facilitates
replication and synthesis, whether through narrative
reviews or meta-analyses. In fact, three recent meta-
analyses of tailored interventions all lamented to
some degree how insufficient reporting made cod-
ing and interpretation more difficult [11, 15, 22].
Similarly, leading scholars in tailoring research
have argued for years that more information on
the ‘black box’ of tailoring is critically important
for the field [12, 13, 23, 24]. A set of accepted
reporting standards would encourage authors to
provide the kind of detail that would help open this
black box. Finally, standardized reporting poten-
tially can improve the conduct of research by pro-
viding clear guidelines and good examples for
researchers and their trainees to follow.

There have been several recent efforts aimed at
improving reporting of original research by various
bodies of concerned researchers, statisticians and
journal editors. [Standards also exist for researchers
interested in synthesizing broader literatures: QUO-
RUM (quality of reporting of meta-analysis) [25],
which evolved into PRISMA (preferred reporting
items for systematic reviews and meta-analyses)
[26]; MOOSE (meta-analysis of observational stud-
ies in epidemiology) [27] and the Potsdam consul-
tation on meta-analysis [28]]. One of the most
visible is CONSORT (Consolidated Standards of
Reporting Trials) [29], which was developed to ad-
dress deficiencies in the reporting of randomized
controlled trials (RCTs). To date, CONSORT has
been adopted by 350 journals and various editorial
groups. Two other sets of reporting guidelines
meant for a broader array of research designs also
are available: TREND (Transparent Reporting of
Evaluations with Non-experimental Designs) [30]
and AREA [Standards for Reporting on Empirical
Social Science Research in American Educational
Research Association (AREA) Publications] [31].

In an effort to synthesize guidelines for reporting
original empirical research, the American Psy-
chological Association (APA) Publications and Com-
munications Board convened a working group on
journal article reporting standards (JARS). The
group compared CONSORT, TREND and AREA
and produced ‘a combined list of non-redundant
elements’ across the three sets of recommendations.
The result is JARS. [The APA working group also
reviewed and synthesized QUORUM, PRISMA,
MOOSE and the Potsdam Consultation and pro-
duced MARS (meta-analysis reporting standards)
[32]]. The APA report notes that JARS can be mod-
fied to reflect research designs beyond those currently
covered in the basic template. A logical extension is
that JARS recommendations can be expanded to re-
fect the needs of particular research traditions, such as
tailored interventions. The purpose of this article is to
offer a set of recommendations specific to tailoring
research to complement JARS.

Development of recommendations for
tailoring studies

As noted above, over the course of conducting
reviews of the tailoring literature, we have observed
a good deal of inconsistent reporting: sometimes
information is unclear or hard to discern; other
times, it is omitted. This inconsistency is not sur-
prising given the relative youth of the field and
the fact that, unless there are clear reporting
standards, it is easy to simply overlook details that
may be obvious to the researchers but not so obvi-
ous to the readers. Indeed, reports of RCTs were problematic before CONSORT, and although some problems in reporting still exist, they are less prevalent than before CONSORT appeared [33, 34]. Our goal here is to provide a set of recommendations that tailoring researchers can follow to facilitate and promote clear and consistent reporting. (The first published report of an RCT appeared in 1948 [35]; the CONSORT statement was published in 1996—a 50-year lag time. The first meta-analysis was published in 1977 [36]; the first set of guidelines for reporting meta-analyses was published in 1995 [28]—an 18-year lag time. The first report of a tailored intervention was published in 1991 [7], so the tailoring literature is just beyond the 20-year mark).

We developed the recommendations for tailored intervention reporting standards in four steps. First, on the basis of our knowledge of the literature, we developed 10 initial recommendations that elaborated guidelines from APA JARS and that addressed what we believed to be the most significant elements for any report of a tailored intervention trial. Then, we invited several experts in the field to participate on an advisory board and provide feedback on our recommendations; simultaneously, we submitted the paper to an international convention and subsequently presented it for audience feedback [37]. Next, we took all of the feedback and revised the recommendations, elaborating, honing and reorganizing to develop a set of seven recommendations that would be specific to tailoring and non-redundant with APA JARS and CONSORT. Finally, we submitted the revised recommendations to our advisory board and gave members the opportunity to provide additional feedback. The list presented in this manuscript is the final version. (Recommendations 4–6 were slightly reworded on the basis of helpful suggestions by an anonymous reviewer).

### Reporting standards for studies of tailored interventions

Evidence suggests that when standards are adopted by journals (and followed by authors), there is an improvement in reporting [33, 34]. As mentioned, although the tailoring literature manifests many strengths, some of the reporting is inconsistent or incomplete. To strengthen both the presence and depth of reporting elements that are particularly important to this field, we urge the tailored intervention research community not only to follow standard RCT reporting guidelines such as APA JARS or CONSORT (which they often do) but also to adopt the tailoring-specific recommendations presented in this manuscript. We describe the recommendations below and summarize them in Table I. Whether authors integrate this information in the text of their manuscripts or summarize it concisely in tabular form (as we demonstrate in later), the

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Title, abstract, keywords</td>
<td>Include some variation of ‘tailor’ in the title, abstract and keywords</td>
</tr>
<tr>
<td>Variables/constructs</td>
<td>Specify variables/constructs used for participant assessment in relation to intervention development</td>
</tr>
<tr>
<td>Theoretical foundation</td>
<td>Describe how theory guided intervention message design (selection of constructs and intended outcomes)</td>
</tr>
<tr>
<td>Tailored messages</td>
<td>Describe the type of the tailored messages participants receive using contemporary terminology</td>
</tr>
<tr>
<td>Tailoring system</td>
<td>Describe the tailoring system algorithms</td>
</tr>
<tr>
<td>Intervention channel, format, dosage and context</td>
<td>Describe intervention channel, format and ‘dosage’ of tailoring; describe content (e.g. standard care) that control/comparison group received (if applicable); describe extent to which the tailored intervention was part of a multi-component program (if applicable)</td>
</tr>
<tr>
<td>Intervention implementation and assessment</td>
<td>Describe how frequently participants received intervention content and when they received it in relation to assessment</td>
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</table>
length of their manuscripts need not be significantly increased; this is especially true when authors can publish an intervention development article first and then cite that publication in the article reporting main outcomes. Thus, these recommendations offer flexibility with regard to ‘how’ authors report this information. In addition, these recommendations offer flexibility with regard to ‘where’ in a manuscript the information is reported. In some cases, information from recommendations may cluster in particular sections of a paper (e.g. methods section), whereas in other cases, information will be reported elsewhere in the paper (e.g. title).

**Recommendation 1: Include some variation of ‘tailor’ in the manuscript title, abstract and keywords**

In the manuscript’s title, abstract and keywords, we urge authors to include some variation of the word ‘tailor’. In our database of close to 400 references, only 50% of the publications contain ‘tailored’ or ‘tailoring’ in the title. For proper article indexing and ease of retrieval in literature searches, using precise terminology is important. Although we found a few cases where authors used the terms ‘individualized’ or ‘personalized’ to describe a tailored intervention, such terms have specific meaning in the tailoring literature and do not reflect tailoring on the whole (see Recommendation 4, below).

Two good examples of titles of articles that report on tailored interventions are ‘A computer-tailored dietary fat intake intervention for adolescents: results of a RCT’ [38] and ‘Cultural tailoring for mammography and fruit and vegetable intake among low-income African American women in urban public health centers’ [39].

**Recommendation 2: Specify variables/constructs used for intervention message design**

One of the defining characteristics of tailoring research is the use of pre-intervention assessment of variables on which messages are subsequently tailored. The second recommendation, therefore, is central to the tailoring approach: authors should specify which theoretical variables/constructs were used for participant assessment in relation to intervention development and clearly distinguish them from variables used for other purposes (e.g. sample description). In particular, because there is fragmentation in the health behavior theory literature, with similar constructs appearing across theories but with different names [40], authors should plainly state which constructs were assessed using the terminology from the theory employed.

In a study designed to promote physical activity among adults, Marcus et al. [41] drew on the Trans-theoretical Model (TTM) and Social Cognitive Theory to inform the selection of variables: ‘The expert system reports … included feedback on physical activity behavior, stage of change, processes of change, decisional balance and self-efficacy’ (p. 403). Champion et al. [42] based their study of mammography adherence on the Health Belief Model and the TTM when they developed their intervention messages to address ‘perceived risk, benefits, barriers and self-efficacy and … stage of adoption’ (p. 418) of screening behavior.

**Recommendation 3: Describe how theory informed intervention message design**

The third recommendation involves explaining how theory guides intervention message design. As discussed above, the tailoring literature relies heavily on psychosocial/behavioral theories, and reviews of the literature find that many studies use multiple theories. Authors, therefore, should be clear about ‘how’ the theory or theories were actually used to inform intervention message design. That is, while Recommendation 2 urged authors to clarify which variables were assessed for tailoring purposes, this recommendation focuses on how theory informs the instantiation of the variables in message content, format or structure. For example, if an intervention is informed by the Activation Model of Information Exposure [43] and aims to attract the attention of participants through manipulating message sensation value, the researcher should describe how tailored messages are designed to be high or low in sensation value. If an intervention is based on Social Cognitive Theory [44] and aims to address self-efficacy, the researcher should describe how
tailored feedback messages are designed to enhance
dlow self-efficacy or reinforce high self-efficacy.
This appears to be one of the most neglected aspects
in intervention description, yet, we would argue,
one of the most important for theory development.
For this reason, although describing how theory
informs message design is relevant to areas beyond
tailoring, we believe it is necessary to include it as
a recommendation here.

Kroeze et al. [45] used the Precaution Adoption
Process Model [46], which emphasizes awareness
of personal risk behavior, to inform the design of
messages in their study: ‘The feedback library con-
tained messages aimed at increasing awareness of
own fat consumption by providing feedback on fat
intake’ (p. 228). Drawing on Social Cognitive The-
tory, Ten Wolde et al. [47] provide a description of
how their benzodiazepine intervention messages
were designed to influence theoretical determinants
of behavior change:

Recommendation 4: Describe the type of
tailored messages participants receive
Related to the third recommendation, Recommenda-
tion 4 is to specify the type of the tailored messages
participants receive. In providing the description,
researchers should strive to use the most contempo-
rary terminology available, reflective of the evolution
of the field. When researchers use a variety of differ-
ent terms to refer to the same phenomena in tailoring,
confusion can result and synthesis suffers. In order to
facilitate the use of contemporary terminology, we
present a compilation of terminology and definitions
in Table II. These terms and definitions are derived
from the thoughtful work of Hawkins et al. [2] and
Dijkstra [48].

The term ‘content matching’ (also referred to as
adaptation, customization and behavioral construct
tailoring) captures the crux of tailoring: the content
of messages is matched to how individuals score on
constructs theoretically associated with the out-
come of interest (e.g. attitudes, self-efficacy, behav-
ioral intention). In many ways, this term is one of
the most synonymous with the term ‘tailoring’ itself. In efforts to open the black box of what ingre-
dients make up tailored messages, the terms ‘feed-
back’ and ‘personalization’ have been proposed,
and we endorse the use of these terms. For example,
within the context of content-matched messages,
various types of feedback (descriptive, comparative
or evaluative) and personalization (identification,
raising expectation, contextualization) strategies
can be used. Thus, these terms give us a language
to describe the specific messaging strategies that
can be used in tailoring.

(An anonymous reviewer made this insightful ob-
servation: ‘Requiring researchers to “use the most
contemporary terminology”’ may be pushing a rock
uphill. In fact, contemporary may actually be coun-
terproductive to the author’s hopes of achieving
some standardization, as researchers keep parsing
concepts in hopes of claiming originality’. We agree
that there is always the risk that researchers may
parse terms merely in an attempt to make their
own mark on the literature. This is poor scientific
practice, however, and it may be curtailed when
reporting guidelines are available. Of course, as a lit-
erature evolves, there may be theoretically compel-
ling reasons to parse current terms or add new terms.
It is in this sense that we mean researchers should use
the most contemporary terminology available).

Evers et al. [49] include comparative-normative,
comparative-progress (termed ‘ipsative’ in this ex-
ample) and evaluative feedback in their intervention:

The first intervention time point provided stu-
dents with normative feedback only. This norma-
tive feedback compared the individual’s use of
change principles and processes to peers who
were most successful in progressing. Sessions 2
and 3 provided both normative (compared to
peers who progressed the most) feedback on their
current use of TTM variables and ipsative (compared to self) feedback on how they were progressing since the last interaction with the program. For example, the ipsative feedback might inform particular students they had progressed two stages since their last interaction, which meant they had about tripled their chances that they would be free from any bullying role in the next six months. (p. 403)

The interpretation of the progression through the stages of change (i.e. tripling the chances of being free from bullying) is what constitutes the evaluative feedback; Recommendation 4 would have Evers et al. [49] label this feedback evaluative and would urge them to use ‘comparative-progress’ instead of ‘ipsative’.

Marcus et al. [50] provide a clear example of both identification and raising expectations: ‘This booklet was personalized by referencing the participant by name and explicitly acknowledging that the booklet was prepared “Just For You” using information obtained from the participant’s recent call to the CIS (Cancer Information Service)” (p. 89). Kreuter et al. [39] employed contextual tailoring by addressing issues of culture in their study of African American women and fruit/vegetable consumption or mammography: ‘All CRT (culturally relevant tailoring) magazines [i.e. both those focused on FV (fruit/vegetable) and mammography] were tailored on two of the four cultural constructs, religiosity, collectivism, racial pride and/or time orientation’ (p. 56). Kreuter et al. also contextualized the intervention.

### Table II. Contemporary terminology and definitions in tailoring research

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Hypothetical example</th>
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<tbody>
<tr>
<td>Content matching</td>
<td>Matching appropriate intervention content (based on key theoretical determinants) to the individual</td>
<td>—</td>
</tr>
<tr>
<td>Feedback</td>
<td>Providing messages to participants about their psychological or behavioral states</td>
<td>‘You told us that you never use condoms when you have sex’.</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Repeating back objective data to the participant</td>
<td>‘Your answers indicate that compared with other people like you, you underestimate the benefits of using condoms’.</td>
</tr>
<tr>
<td>Comparative-normative</td>
<td>Comparing a participants’ data to those of their peers</td>
<td>‘Your answers indicate that compared with your last visit, you are using condoms less often’.</td>
</tr>
<tr>
<td>Comparative-progress</td>
<td>Comparing participants’ data to their data at a previous time point</td>
<td>‘By not using condoms when you have sex, you are putting yourself at risk for contracting sexually transmitted diseases’.</td>
</tr>
<tr>
<td>Evaluative</td>
<td>Providing judgments or interpretations of participants’ data</td>
<td>—</td>
</tr>
<tr>
<td>Personalization</td>
<td>Incorporating recognizable aspects of participants to convey (implicitly or explicitly) that the messages are specifically designed for them</td>
<td>—</td>
</tr>
<tr>
<td>Identification</td>
<td>Using a participant’s name or other unique identifier(s)</td>
<td>Person’s name, age or preferred brand of condom is integrated into messages</td>
</tr>
<tr>
<td>Raising expectation of customization</td>
<td>Making participants explicitly aware that the intervention was designed uniquely for them</td>
<td>‘This program will ask you questions and provide feedback designed especially for you on the basis of your answers’.</td>
</tr>
<tr>
<td>Contextualization</td>
<td>Framing messages in a context that is meaningful to participants</td>
<td>Embedding gender- or race/ethnicity-matched images in intervention messaging</td>
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</tbody>
</table>

Definitions are based on Hawkins et al. [2] and Dijkstra [48]; for in-depth discussion of these tailoring mechanisms, refer to these publications.
by including filler stories tailored on participant characteristics (e.g. age) and topic interest (e.g. local African American history, books and reading, parenting).

Of course, tailored intervention messages may not necessarily draw explicit attention to the connection between a participant’s responses and subsequent messages. For example, a person might indicate that she faces certain barriers toward a particular behavior and subsequently be provided with a narrative in which a character who is similar to her overcomes those barriers, or a person might perform poorly on a quiz and subsequently be provided with information to correct his knowledge deficit. Whether or not persons are aware that their responses are connected to the messages they receive may have an impact on behavior [51, 52]; therefore, researchers should make this aspect of their intervention design clear to the reader.

Recommendation 5: Describe the tailoring system algorithms

The fifth recommendation asks researchers to open the black box of tailoring and describe the tailoring system algorithms. In other words, researchers should describe how assessment data provided by participants result in particular messages output by the computer program. For example, if a participant completes a knowledge quiz on sexually transmitted diseases and scores a 70%, what message does this score generate? What message does a score of 50% generate? Further, on what basis did the researcher decide which scores would result in which messages? If messages are informed by existing databases (e.g. for normative feedback), researchers should specify what database was used for comparison purposes.

Campbell et al. [5] describe the decision rule for providing tailored feedback on dietary fat consumption:

For dietary fat, participants were given feedback in graphic form depicting their current intake as ‘high’ or ‘low-moderate’. This evaluation was made by comparing the individual’s dietary score with the 75th percentile of the distribution of fat intake in this population, as determined by pre-testing with 55 family practice patients prior to the study. (p. 785)

In their study of mammography and fruit/vegetable consumption among African American women, Kreuter et al. [39] describe the decision rule for presenting intervention materials tailored to cultural constructs:

All CRT [culturally relevant tailoring] magazines … were tailored on two of the four cultural constructs, religiosity, collectivism, racial pride and/or time orientation. Tailoring on a given cultural construct occurred only when a woman scored high on that scale, not low. When a woman scored high on more than two cultural construct scales, the two highest scores (based on a proportion of the maximum score possible) determined which constructs would be used as the basis of tailoring in her magazine. (p. 56)

We recognize that providing a comprehensive description of all tailoring algorithms probably is not possible given journal page space limitations. However, authors should do what they can to report the most theoretically salient decision rules.

Recommendation 6: Describe tailored intervention channel, format, dosage and context

Persuasive messages constitute the heart of tailored interventions. Recommendation 6 first asks that researchers describe channel, format and ‘dosage’ of these tailored persuasive messages as thoroughly as possible. Its focus is on ‘how’ the content of the intervention is delivered. It also asks, when applicable, that researchers describe the intervention context—what is provided to participants in the comparison condition (e.g. standard care) and how the tailored intervention was situated in the context of a multi-component program.

Tailored messages come in many forms. Print was the initial channel of choice, but even with
print, there are multiple possible formats: letters, newsletters, handouts, brochures, manuals, calendars and so on. More ubiquitous these days are computer- and Internet-based interventions. The format of these programs can vary widely and can include audio/video components in addition to text and still images. The point is that the channel and format should be described. Beyond that, however, and specific to tailoring is that the ‘dosage’ of tailored material should be specified. For example, a newsletter might consist of 10 paragraphs, only two of which contain tailored content. A computer-based program might consist of several different Web pages, only a subset of which contains tailored feedback.

In a study of a tailored ‘brief advice’ intervention for trauma patients, Neumann et al. [53] describe the intervention ‘channel’: ‘The results were displayed on the computer, and a letter summarizing the intervention was then printed and provided to the patient before discharge from the ED’ (p. 806).

In a study designed to encourage smoking cessation among African Americans, Lipkus et al. [54] describe the ‘format’ of their printed intervention materials:

‘Tailored print communications (TPCs)’ were sent to patients around the time of their birthdays. . . The first was an oversized (7 × 8 1/2 in opening 8 1/2 × 14 in) tailored birthday card with a picture of the clinic staff on the cover; the second version was a personalized 8 1/2 × 11 in ‘Healthy Birthdays’ newsletter. (p. 79)

In terms of the question of tailoring ‘dosage’, Brug et al. [6] provide a description of tailored and non-tailored elements in letters received by participants in their study of a nutrition intervention:

A ‘normal’ tailored letter would introduce the subject of healthy nutrition first. Subsequently, the participant’s individual fat score would be presented and compared with the recommendations and the participant’s peer group average fat score both in words and in a graph. Thereafter, low-fat alternatives would be suggested for the participant’s main dietary fat sources. Finally, the letter’s ‘fat paragraph’ would end with addressing the participant’s specific positive and negative beliefs about fat reduction, which were derived from the screening questionnaire. (pp. 238–239)

Recommendation 6 also includes consideration of the intervention context in terms of control/comparison groups and other components that may be included in the intervention. When the research design includes a comparison condition beyond ‘no treatment control’, authors should describe what the comparison participants receive. Whether comparison participants receive ‘generic’ messages designed for the study, existing program materials, current standard of care or something else, knowing what constitutes the comparison condition will help readers interpret the effectiveness of the tailored intervention. To the greatest extent possible, authors should report information about comparison conditions that parallels information about the tailored condition (e.g. channel, format and dosage of any ‘standard of care’ materials).

Related, Recommendation 6 also includes situations in which a tailored intervention is one part of a multi-component program. In those cases, authors should describe the other elements of the program (e.g. interpersonal counseling sessions) and convey to the reader ‘how much’ of the program is tailored. Without such knowledge, authors of subsequent reviews and meta-analyses of the literature will not be able to appropriately categorize and compare these differing types of programs.

Recommendation 7: Describe intervention implementation and assessment schedule

This recommendation advises researchers to describe how intervention delivery is scheduled in relation to assessment and how often and over what period of time study participants are presented with intervention materials. Its focus is on ‘when’ the intervention is delivered and assessed. Participants may receive one printed letter immediately after assessment or 1 week after assessment; they may receive a total of four
letters over 4 weeks or four letters over 12 weeks; they may be reassessed at various time points during the study and that reassessment may or may not be used to inform subsequent message design (i.e. whether comparative-progress feedback is provided). Whatever the implementation and assessment schedule, authors should describe it clearly.

Kiene and Barta [55] describe the delivery of their sexual risk reduction intervention along with their participants’ assessment schedule:

During Session 1, participants completed the baseline assessment and received 15–40 min of intervention content. Two weeks later (+/− 48 hours), participants returned for the second primarily motivational intervention session lasting 10–20 min. Two weeks after Session 2, participants returned to complete the follow-up assessment. (p. 406)

Heimendinger et al. [56] also present intervention delivery and assessment schedule information along with some detail about feedback type (addressed under Recommendation 4) and feedback channel (addressed under Recommendation 6). This is an example of information described under separate recommendations being presented contemporaneously in the published report.

The initial mailing of print materials was sent to comparison and intervention participants 7–10 days after completion of the baseline interview. The SU (single untailored) and ST (single tailored) groups received no further written communication from the research team. The MT (multiple tailored) and MRT (multiple retailored) groups received three more mailings of intervention print materials (two four-page newsletters and a final two-page letter). The MT materials for the final three mailings were tailored on information obtained in the baseline interview; MRT materials were retailored on information obtained from the 5-month follow-up survey completed by all study groups. Materials were mailed to MT and MRT in the following time sequence: 7–10 days after completion of the 5-month follow-up survey and 8 and 11 months after baseline. A final follow-up survey was conducted 12 months after baseline for all research participants. (p. 68)

Recommendation 7 applies to interventions delivered via audio and computer (CD-ROM or Internet) channels as well as print channels. Particularly in the case of Internet-based interventions, which are becoming more and more prevalent, authors should share the nature of their correspondence with participants (e.g. instructions on how to access the intervention Web site, frequency of prompts to visit the Web site), whether participants were given unlimited access to the site or access was somehow controlled and what kind of tracking, if any, was done of participants’ visits to the site.

Additional Considerations
The above seven recommendations constitute the foundation of what we believe should be included in reports of tailored intervention studies. As with any set of recommendations, of course, there is certain leeway depending on circumstances. For example, perhaps aspects of intervention development already have been reported in a prior publication. In that case, authors can simply reference the prior publication. For cases in which journal page space is extremely limited, we urge authors to provide a summary description of their work in the format presented in Table III.

Alternatively, although having information readily at hand in the actual publication is ideal, certain information could be made available through an auxiliary outlet, either one that the journal maintains or one maintained by the author. Such information could include actual examples of tailored messages that appear in an intervention. It also could include a comprehensive description of the tailoring algorithms.

Conclusions
Tailored interventions are extremely promising and stand as an exemplar for theory-based applied
research. Although tailoring research began only two decades ago, the approach has grown remarkably fast and shows no sign of slowing down. Indeed, with the implementation of health care reform and increased development of eHealth applications [59], we anticipate even more research in this area.

On the basis of our review of the tailoring literature and reporting guidelines from several sources and with feedback from an advisory board composed of some of the field’s leading scholars, we developed this set of seven recommendations to accompany standard RCT reporting guidelines (e.g. APA JARS, CONSORT). We call on authors

| Table III. Example of the reporting standards applied to the report of a tailored intervention [57] |
|-------------------------------|-------------------------------------------------|
| Recommendations | Description |
| 1. | Tailored Information Program for Safer Sex (TIPSS) |
| 2. | Tailored feedback was provided to all participants on stage of change for consistent condom use, condom use behavior, hormonal birth control, condom attitudes (pros and cons), condom social norms (descriptive, injunctive and partner norms), condom self-efficacy and condom negotiation strategies. This feedback was specific to partner type (main/steady and/or or casual). All theoretical constructs (with the exception of negotiation strategies) were derived from the Attitude-Social Influence-Efficacy (ASE) Model, which itself is an integration of several theories including the Theory of Reasoned Action and TTM. |
| 3. | The full ASE model was used to inform the theoretically based messages. Stage of change messages provided feedback on readiness to change consistent condom use and current behavior. All subsequent messages were targeted based upon a person’s stage of change, with messages in early stages focusing on cognitive activities and later stage messages focusing on behavioral activities. Attitude messages emphasized the positive aspects (pros) and strategies to reduce the negative aspects (cons) of using condoms with (main or casual) partners. Norms messages emphasized the normative nature of condom use among African Americans and the importance of seeking out supportive friends, family and partners. Self-efficacy messages focused on confidence-building strategies such as planning ahead for condom use and talking to one’s partner. Negotiation messages focused on strategies to negotiate condom use with a main or casual partner (for examples of feedback messages, see [57]). |
| 4. | The ‘raising expectation’ personalization tactic was used, as participants were told that messages were uniquely designed for them based on their answers. Participants received ‘descriptive’ and ‘evaluative’ feedback on condom stage of change, condom use behavior and hormonal birth control. Then, ‘comparative’ and ‘evaluative’ feedback was provided on all remaining theoretical constructs, based on pre-determined empirical cut-offs developed by stage of change. The data used to develop these cut-offs were collected in a prior study conducted with the same population [58]. |
| 5. | Feedback on stage of change was provided based upon a standard algorithm (see [58]) that placed individuals into one of five stages of change. Pre-determined empirical cut-offs (developed with the concept of moving participants ahead by one stage) determined what type of feedback individuals received on the remaining theoretical constructs. All theoretical feedback was specific to both stage of change for consistent condom use and partner type (main or casual). When an individual in a particular stage of change scored at or above the cut-off, they received praise and brief feedback. When an individual scored below the cut-off, they received more extensive feedback. There was also a ‘click to learn more’ option that allowed those receiving the more extensive feedback to have some choice of what content they viewed. |
| 6. | TIPSS assessment and intervention took place on a laptop computer that was not connected to the Internet in a private room at the clinic. In addition to tailored feedback, all participants received two interactive skills training exercises focused on correct condom use and condom negotiation. Assessment and feedback took place in the order described in Point 3 above, followed by the skills training exercises (also see reference [57], Figs. 1 and 2). TIPSS condition participants received the TIPSS program, stage targeted print ‘take away’ materials and a selection of up to 36 condoms from a large assortment, plus lubricant. Comparison condition participants received a computer assessment, a generic information-only pamphlet on reducing sexual risk and 12 ‘standard of care’ condoms, plus lubricant. |
| 7. | Participants interacted with the computer in a single 45-min session and returned to the clinic to complete a 30-min follow-up computerized assessment 3 months later. All tailored feedback was provided at baseline immediately after each construct was assessed. |
and journal editors to give serious consideration to these recommendations and to follow them when reporting on and publishing studies of tailored interventions. Standardized reporting not only can promote reader understanding but also can facilitate replication and synthesis and potentially improve research by providing an exemplar for others to follow. If we are to build a cumulative science of tailoring, both for theory development and research translation, then we must follow quality standards in the conduct and reporting of the science.

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Conflict of interest statement

None declared.

References


